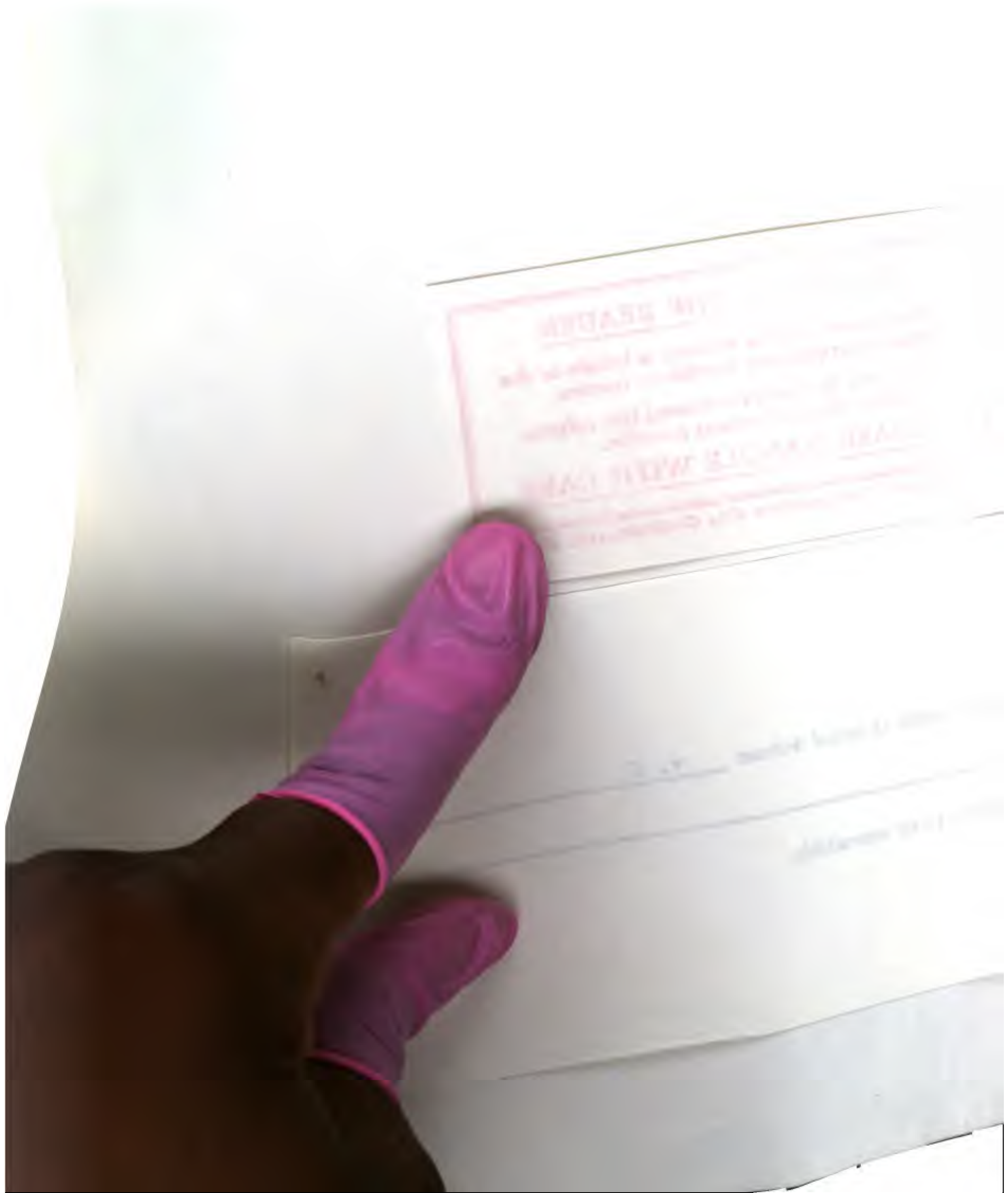
The Idaho Forester



The Idaho Foreste

Associated Foresters

University of Idaho

Moscow, Idaho

1921

IDAHO WHITE PINE

To

Dean FRANCIS GARNER MILLER

whose high ideals, untiring efforts, friendly cooperation and boundless patience afford a constant inspiration not only to every member of the School of Forestry but also to the entire University of Idaho, this Annual is affectionately dedicated.

The Idaho Forester

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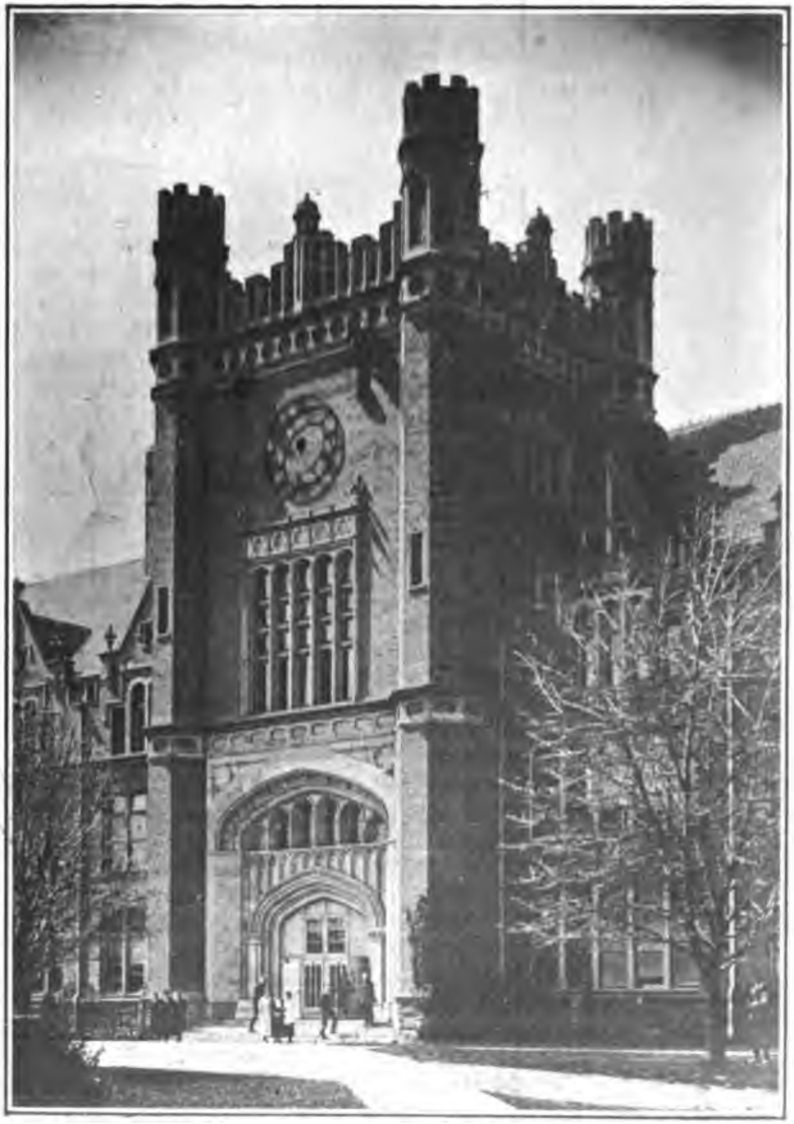


ADMINISTRATION BUILDING
University of Idaho

FORESTRY—NOW OR LATER?

A Plea for a Constructive National Land Exchange Policy

By C. L. BILLINGS, *Land Agent, Edward Rutledge Timber Company,* Coeur d'Alene, Idaho

For over twenty years the subject of a National forest policy has in greater or less degree agitated the public mind. Foresters and forest economists have tried persistently to hammer home this great basic truth—that if the United States, as a nation, is to continue to saw lumber, it must, as a nation, provide trees to saw it from.

Yet this same period of agitation has marked the finish of the lumber industry in states which once led the nation in the annual cut of lumber and has marked the serious decline of the industry in many others. And this period, too, has witnessed the growth to high rank of the lumber industry in the Western States.

During this epoch-making period what constructive accomplishments mark the progress of the forestry idea? Two things that overshadow all others: One, the establishment of the vast system of National Forests under the direction and supervision of the Forest Service; and the other, the birth, growth, and finally the enormous expansion of cooperative forest protection by private owners started by a few Coeur d'Alene Timbermen in 1906.

The National Forest idea was transformed into a working national policy in spite of the emphatic protest of the states in which the Natonal Forests were located. So great was the hue and cry and so determined the opposition that when the issue was finally decided the public mind was quite ready to think of other things—and was allowed to do so.

A great victory had been won. A vast national store house full of timber for the nation's coming needs had been placed in competent hands. What more was there to do? With the enormous task of organizing the National Forests for administration before them small blame can be attached to the few foresters available for that task if they did not look about for other fields to conquer. Indeed the private owners had seen the light in the forest protection idea and had started on their own initiative a comprehensive timber protection policy.

A number of history making years in forestry passed by—years in which the facts hammered home in the early agitation had proved themselves and the alleged facts of the same period had also proved themselves—to be wild guesses; years in which to a marked degree foresters had shown themselves competent to run the business of forestry.

But during these same years foresters and forest economists had been slowly taking in the nation's timber store house, and had been carefully measuring the consumption of forest products throughout the land, keeping an anxious eye, too, on the annual fire loss.

Finally the time came to agitate the pubic mind again. Unfortunately, or fortunately, according to the point of view, the splendid achievements of the foresters during the years immediately preceding were discounted by a few members of the profession who assumed that it would again be necessary to combat the private interests in order to subdue and convert them. At any rate another hue and cry was raised, this time also by the foresters, to hammer home the same basic truth about the relation of the production of lumber to the supply of trees to cut it from.

It was shown quickly and convincingly at the outset that the vast national store house of timber in the National Forests was not so vast after all for after stock had been taken it was necessary to discount liberally enormous areas of water surface, mountain tops, brush and non-commercial timber which were included in the Forests and which, while having a rather indefinite but none the less positive value for recreation, will never produce any lumber for the nation's needs. Speaking in terms of potential forest land—land adapted to and best suited, economically, to the continuous production of forest crops—the supply wasn't going to go around. There wasn't land enough in the National Forests to grow timber in sufficient volume to meet the nation's annual needs.

If this was true, and if the nation's needs were to be met, it was obvious that it was going to be necessary to introduce the prac-

tice of forestry on lands not at the time in government ownership.

In the minds of nearly everyone in touch with the subject this meant that to change the method of handling the forest growth on the land it was going to be necessary to change the ownership of the land itself. Under present tax, economic and financial conditions it is entirely infeasible in most western states, at least, if not in all states, for private capital to interest itself seriously in the uncertain returns available from the practice of forestry. It follows then that if forestry is not now within reach of the private owner the states or the nation or both must undertake it on a scale commensurate with the country's requirements. Since the National Forests provide a splendid nucleus around which to build, government ownership of potential forest land has commended itself to many as the easiest solution of the problem.

Thus the problem itself has become fairly well defined. It involves the transfer to government ownership of a sufficient quantity of potential forest land to provide enough area in the aggregate, with what the government already has, to yield an annual crop at least equal to the nation's annual consumption of forest products.

Various other important factors have a bearing on the problem. One involves the protection of areas of young growth from fire. Enormous areas of reproduction in private ownership have been saved from fire by the cooperative forest protection work of private owners. How much longer will it be possible for the private owners to hold on to these lands? The cost of taxes and protection is out of all reasonable proportion to any value which can be put on these lands under the conditions of past years. They are decidedly expensive lands to own. Yet the lack of a market for them has naturally resulted in no value having been placed on them and carrying charges have mounted steadily higher until they are dangerously near the breaking point. Forest protection by private owners is, and must be, under present conditions, based on the idea of protecting a present asset—merchantable timber. It is fortunate that in some states, notably Idaho, it has been possible incidentally to protect reproduction also. At the present time the larger acreage in the western states is in merchantable timber but this condition is rapidly changing and inevitably the time will come when the larger acreage will be in cutover lands. Right then private forest protection will begin danger of falling of its own wei some constuctive policy is evolved fix both a value and a market for of land.

The reversion for taxes of tho acres of desolate barren wastes in states and in other once forested co is ample, and should be convincin this.

The time to protect forest grow doubtedly when the forest growth land but there must be, for the priv some incentive to have it and keep it

Another factor involves a phase of lem which is so important as to mistaken for the problem itself—the ing question of private ownership tial forest land within the Nation boundaries, and immediately adjacen on the outside. The location of the Forest boundaries originally was b so much on a careful classification o on matters of political expediency promise and matters of land o Boundaries were often located to large areas of potential forest land the land was in private ownership a of the public domain were left on th in deference to local sentiment. In however, a large acreage of privatel land was included inside the boundari

The ownership of this land ranges individual claim owners with a qua tion or less, to small blocks owned lumber companies and on upwards i to the enormous checkerboarded gran railroad companies.

These lands under the present o are an effective bar to the most management of the National Forests in many cases the creation of the Forests placed an effective barrier be possible development of the privatel lands. Each is in the other's way respect affecting the management of e

The small claim owner surrounded tional Forest land has no opportuni ever to either log his claim or sell as a part of the natural operating unit it may be situated and in the deter of the selling policy of the govern affecting this unit he can naturally voice.

What is true o the small owners is the same degree of the larger owne checkerboard situation has often p

large drainages, some of them containing several hundred million feet of timber from being properly administered and developed by either owner.

Still another aspect of the problem is the effect if any which the proposed exchanges would have on local tax receipts. Unquestionably the states and counties stand to win in the long run through the placing of additional areas of forest land under management. The share in the gross receipts from the National Forests which is distributed to the counties on an acreage basis already in some localities amounts to more than the taxes would come to if the land were privately owned. As cutting progresses and the present areas of private timber are changed into areas of cutover land this condition would undoubtedly in time be universal if the history of the older forested regions is to be repeated in the new.

And so with the problems and all its various corallaries, before the nation some program must be worked out in solution. Much has already been done in outlining a policy which has received the cordial support of the lumbermen, pulp and paper people, the wood using industries, foresters and thru the forestry associations the general public. The point of attack centers in the Snell Bill introduced in the House of Representatives at the last session by Representative Snell of New York. This bill provides for two things of especial interest and importance so far as this article is concerned. One is the proposal for a very greatly increased participation by the Federal government in private forest protection; and the other is a provision for the authorization of a general land exchange policy.

Increased Federal participation in private protection work is to be predicated largely on the extension of this work to include areas of immature timber and while it will be appreciated and welcomed by the private owner, had the bill not also included the land exchange section, he might well have wondered why the private owner should protect young growth at all if he could never realize on his investment in it.

The land exchange section of the bill is as follows:

"That the Secretary of the Interior be, and hereby is, authorized to accept on behalf of the United States, title to any lands within or adjacent to exterior boundaries of National Forests if in the opinion of the Secretary of Agriculture, the public interests will be benefited thereby and the lands are chiefly valuable for national forest purposes, and in exchange therefor may give not to exceed an equal value of such national forest land or timber or assignabe certificates for timber within the national forests as may be determined by the Secretary of Agriculture and accepted by the owner as fair compensation, consideration being given to any reservations which either the grantor or the government may make of timber, minerals, or easements. Such assignable certificates for timber shall be issued under the authority of the Secretary of Agriculture, shall be for the agreed value at their face value when accompanying bids for the purchase of national forest timber or in payment for national forest timber purchased under existing laws and regulations. Any timber given under such exchanges shall be cut and removed under the direction and supervision and in accordance with the requirements of the Secretary of Agriculture. Lands conveyed to the United States under this section shall, upon acceptance of title, become parts of such national forests as the Secretary of Agriculture shall designate:

"Provided: that the Secretary of the Interior shall report to congress annually the quantities of such land exchanges as are consummated and the names of the parties thereto."

The wording is broad and sufficient and avoids the restricting limitations which were the faults of the bills passed some years ago. One of these, the Forest Reserve Lieu Selection Act, provided for exchanges on the basis of equal area. Obviously it was nearly impossible to work out a fair trade on that basis. Another law required both equal value and equal area. Trades on this double basis were as a general rule physically impossible.

The bill would supplant some thirty other local bills now pending in Congress which affects an individual National Forest or two. It is broad in the sense of terrritorial application.

The authorization is provided in sufficiently broad wording to take care of all the embarrassing situations we now have. The small claim owner who cannot now dispose of his claim could exchange it all—land and timber—for an equal value of assignable certificates or for an equal value of timber which he could log himself. Large drainages now checkerboarded could be blocked out for operation by the private owners or for more effi-

cient administration by the Forest Service. Relief for both the government and the private owner could be had for a distressing situation which obtains throughout the National Forest region.

But, far more important than the vexing local problems of operation and administration, the bill, through its land exchange section, will show daylight ahead to the private owner in the protection of his cutover lands at the same time that it provides on an adequate scale for the growing of the nation's timber of the future. This will be the saving factor in the whole present situation of the national forestry idea. While wa means, policies and practices, respon and liabilities are being worked out be possible to go ahead and keep tre ing on the areas which are to hold the timber supply of the future.

Now is the time for the inaugurati policy under which the young timt growing can be kept green by provi owners with an incentive to protect is much more important than any que responsibility or of methods at this ti the Milwaukee Sentinel has most ap "The time has now come, not to quibbl grow trees."

THE CONDITION OF OUR FORESTS

By EARL F. BRADFIELD, '24

In order to decide for ourselves whether the statement that our forests are nearing exhaustion is a bugbear created by the large timber owners, or not, let us consider the following facts.

The original forests of the United States are estimated to have covered 822 million acres. In a little more than three hundred years over two-thirds of this area has been cut over, culled, or burned. We have left 463 million acres of forest land of all sorts which contains about 2,214 billion feet of merchantable timber. Three-fifths of the timber originally in the United States is gone.

Our annual wood bill includes more than 40 billion feet of lumber, 87 million hewed railroad ties, 4 1-2 million cords of pulpwood, besides that which is imported, and 110 million cords of fuel. The pressure of the war brought the per capita consumption of timber down to 300 board feet yearly and the country has suffered for it in the shortage of homes and the curtailed output of many industries.

In the face of these figures, Mr. Average Citizen will raise the cry—"But we are just commencing to use the enormous timber supply of the western states." In answer to this, it can be said that we have already made large inroads into the timber of the western states. As the forests of the East gave out, the forests of the South and then those of the West were called upon to supply the deficiency and now that we must look to the Northwest for a large part of our timber supply, the cost of transportation of our lumber suming markets in the middle west ha from $3.00 per M ft., board measure, to $13.00 per M today.

The true index of timber depletion quantity but availability. Our remaini ber is so localized that its availability average user of wood, and therefore its al utility, is greatly reduced.

With these facts in mind, Mr. Avera zen, when you consider that three-fi our timber resources have been squa when you have to pay an increase in the landlord, who takes advantage shortage of homes; when you have to increased price on lumber due to the transportation cost; don't you think th time for some action to be taken on th tion? Are you willing to stand id wringing your hands and crying out shame it is that our forests should wastefully managed or will you put shoulder to the wheel, advocating tha gress provide for:

1. The reforestation of the denuded which at the present time are doing any good;

2. Protection of the remaining sup timber:

3. The insuring of a fair priced crop ber for the future; and do your very see that the measure is passed?

STATE FOREST POLICY

By BEN E. BUSH, *State Land Cruiser*

In considering the question of a state forest policy for Idaho, a simple statement of the basic facts about Idaho's timber is necessary. Of the total land area of Idaho, 43 per cent. is timbered, thickly or sparsely. Of this timbered area, about 80 per cent is included in the National Forests of which there are 19 wholly or partially within the state. The remaining 20 per cent is owned by the State or private individuals. The acreage in the National Forests is approximately 18,000,000 and that outside about 5,000,000. Of this 5,000,000 acres outside of the National Forests about 40 per cent is held by operating companies in large blocks of from 20,000 to 200,000 acres. This comprises the choice timber of the state and was acquired by men of long experience in the lumber business after careful consideration of availability, stand and quality. Altho only 40 per cent of the area, this represents approximately 75 per cent of the timber value in the state outside of the National Forests. The State owns 700,000 acres of timber land or 41 per cent of the forested area outside the National Forests. The value of the state holdings is better than the average value of the timber lands of the entire state, but not so high as that of the lands owned by the large companies. The balance belongs to small holders of all kinds, persons holding from a forty acre tract to two or three sections. This last is of poorer quality and stand of timber and probably worth only 10 per cent of the total value outside of the National Forests, altho comprising 46 per cent of the area.

There are 130 billion feet of timber in the entire state. The state holdings amount to 11 billion feet, 3 billion feet of which are white pine.

There are four large interests affected by the state's forest policy; first, the National Forests; second, the state; third, the larger operating companies; and fourth, the individual owner of the small tract.

The Forest Service through its several National Forests is interested in a supply of timber for the industries of the entire nation for all future time and this will necessitate reforesting both burned and cutover land. This can be done through keeping down fireing losses, by proper methods of silviculture, and possibly by planting.

The state is interested in a future supply of lumber for industries in a minor way, but is primarily interested in the state, a permanent institution and securing revenue from its grant lands to apply to funds for which these grants were made.

The larger operating companies are interested in a minor way with perpetuating the lumber supply and with keeping the lumber business at it present large scope but their primary interest is revenue from their operations.

The individual owner is interested in a minor way with the first two agencies, but his primary interest is revenue from the sale of his timber. In a great many cases, the individual owner is interested in the agricultural value of the land and is anxious to get the timber removed so that he can clear the land and in some cases he is slashing the timber and clearing the land where he gets no return from the timber.

The state is heartily interested in keeping the timber supply such that it will be one of the main industries for all time to come.

It is not the policy of the state at this time either to purchase land for reforesting or to do planting, though this may come at some future time. It is not believed that planting is practical at this time.

The state is now, and has for the past fifteen years, been carefully guarding its own timberland, both green and cutover, from fire and encouraging private owners to do the same. As a whole, the state now has a very effective system of fire prevention and the writer has no hesitancy in saying that the state and the larger private holdings are more effectively protected than the National Forests.

Until the last few years, the greater part of the timber cut for lumber has been from land that is naturally agricultural and there has not been much attention paid to preserving young growth, but as operations gradually work back into the more mountainous districts that are only fit for reforestaton and grazing, the state is looking toward preserving the young growth and in sales made at

this time is requiring the purchaser to pile and burn brush in such a way as to preserve the timber too small for logging.

This is an established policy of the state in sales of state timber and so far as possible the state is trying to get operators to follow this course on their own land. It is doubtful if operators can be compelled by law to do their logging in any certain way as long as they do not endanger other owners in the district where they are logging.

The conditions are quite different in the district north of the Salmon River from that south of the river in two ways. The reforesting conditions are much better in the northern part of the state where the rainfall is greater and the soil is more adapted to growing timber. The waters in the northern part of the state are not used for irrigation purposes and we are not particularly interested in conserving forested watersheds for this purpose. In South Idaho, the reforesting is much slower, but the state is much interested in keeping the higher ranges timbered to conserve the snow for a later run off for irrigation purposes.

The writer thinks that it is necessary that a law be passed by the next legilature to enforce an adequate patrol of all timbered lands. However, it is very necessary that this be an equitable law that will not work hardship on the owner of inferior timber. Many of the smaller owners would be too glad to have their timber burned as they see no chance of getting any value from the stumpage but are anxious to clear the land.

There is naturally a conflict between the four classes of owners in the way of securing title to timbered lands and the proper disposition of them after the title is secured and for this reason the state will have to be independent in its actions

As an outline of what the write should be done by the state toward a forest policy, the following migh out of place:

(1) The state should act alone as above through its constituted authori State Board of Land Commissioners."

(2) The state should prepare an to the next legislative session a Fore

This bill shoud provide for a State

To avoid conflict of authority, and with the constitutional provisions the handling of state lands, this should be the State Land Commissi officer of the State Board.

The state should be divided into tricts. The lands of the northern pa state present entirely different c from those of the south. In the n soil is more of a volcanic ash, the ra greater, the soil holds moisture better reforesting conditions are much bett the south, the soil is more of a granite nature, the rainfall is less, th is quicker and the reforesting condit much slower. All the streams in th have irrigation dependent upon them preservation of the green cover on th sheds is vital to the people. Each districts should have a deputy foreste deputy should have two or three me him in training for forestry work, a should constitute the state's timbe and serve as an advisory board to t Board of Land Commissioners on matters.

Should these ideas be carried out, t can then approach and solve other p which may come up from time to ti confidence of acting wisely.

THE DEVELOPMENT OF THE RECREATIONAL FEATURES OF THE STATE FORESTS OF IDAHO

By FRANK A. BROWN, '22

The people of America are awakening to the value of the recreational use of the public forests. In the older countries, where public forests have existed for centuries, their recreational use has always been recognized. The mountains, glaciers, lakes, streams, woods and natural parks contribute largely and effectively to human health and enjoyment.

Up to the last few years, little attention has been given to the recreational value of the forests of the west because of their abundance and the lack of development of the country. Now, however, with the more intensive development of towns and cities in the west, the need and demands for outdoor recreational facilities greatly increase. This means that the public forests, which are the property of the people, should be developed so as to make them accessible and useful to the great majority of citizens.

The Federal Government has recognized the need and value of the use of public lands for recreation by the establishment of National Monuments and National Parks. The former are established by presidential proclamation, a notable example being the Grand Canyon of the Colorado in northern Arizona; the latter are created only by act of Congress, and are more extensive in area. National Parks and National Monuments are set aside for the primary purpose of preserving and protecting for all time the nation's best points of scenic attraction in order that they may be enjoyed by everyone.

The National Forests, on the other hand, were created for the primary purposes of timber production, grazing and watershed protection. The fundamental policy on which the National Forests are operated is to develop their resources for the greatest good to the greatest number in the long run. In line with this policy, the U. S. Forest Service has recognized that recreation should stand with timber production, grazing and watershed protection as one of the major utilities of the National Forests and now considers the development of the recreational features one of the more important lines of activity.

Many cities over the country have taken leases on forest tracts for municipal playgrounds. And, of course, many cities have extensive parks within their limits for such purposes.

State activity along this line has been largely confined to the East where the more intensive development of the country has made the need more urgent and apparent. The western states, altho possessing large area of forest land, have given little attention to their development for public recreation and little pressure to do this has been felt because the activities of the Federal Government in the National Monuments, National Parks and National Forests have taken care of the needs of this new country well in advance of the demand. Now, however, the western states are realizing that a great service can be rendered the people within their borders by opening up the forest lands for park purposes and making state forests more accessible for public use. Idaho has taken the lead in this work in the West by planning the develpment of two areas of state land, one in the northern and one in the southern part of the state.

Heyburn Park.

In 1909, the State of Idaho purchased an area of 7,840 acres, including land and water, in the northern part of the state and dedicated it to the people for their use and enjoyment. This area is called Heyburn Park in honor of the late Senator Heyburn. It was created out of the Coeur d'Alene Indian Reservation by Act of Congress passed April 30, 1908, and purchased by the State of Idaho by Act of Legislature, approved March 16, 1909. This park embraces Chatcolet, Hidden and Benewah Lakes, all of which are tributary to Lake Coeur d'Alene. It is easily accessible to a large population , including northern Idaho and eastern Washington. The ideal summer climate, beautiful scenic features and its accessibility is rapidly making it very popular as a summer playground. The park is under the control of the State Department of Public Works, and is governed by rules and regulations provided by the department, and enforced by the Park Superintendent. The camp grounds have been developed considerably for the convenience of the public. These improve-

DRAWBRIDGE AT CHATCOLET, HEYBURN PARK, IDAHO

ments include the construction of roads and trails, building of boat landings and the development of watering places.

At the request of the State Department of Public Works, the School of Forestry of the University of Idaho in the summer of 1920 made a reconnaissance of Heyburn Park. A careful estimate of the timber on the tract and a topographic map of the entire area were made as a basis for future management. It was recommended as a result of this reconnaissance that lots for summer homes be laid out in certain favorable localities which were designated upon the map, and that a system of uniform lot rentals be adopted. The construction of cooking fire places, making of sanitary improvements, the development of drinking water supplies and the construction of better landing facilities on the lake shore were also recommended. In addition, plans for the construction of an attractive archway at the entrance to the park, for swamping out of camp sites and drive ways and for road development were submitted.

Big Payette Lake.

Payette Lake is situated about 90 miles north and 5 miles east of Boise. It is easily accessible, both by auto roads and railroad. It has an altitude of 5000 feet, ideal climate for a summer resort, wonderful scenic attractions and splendid recreational features. The state lands about Big Payette Lake are being extensively used as playgrounds by th of southwestern Idaho. These lands of about 15,000 acres, which include miles of lake front, one-half to two- which are suitable for camp groun rest of the lake front, comprising 6 to is owned privately and generally summer home purposes. The number ists visiting Payette Lake has been in annually till they now number ma sands per season. This resort is de become one of the most popular pla of the Northwest.

In the summer of 1918, protests were by tourists against the cutting of th along the lake shore. The Columbian Boise took up the fight and carried State Board of Land Commissione Land Board called on the School of to make an investigation of the cutting was done the latter part of February, Dean F. G. Miller, who reported th from a narrow strip along the lake s rest of the tract should be cut, prov cutting was done under regulation would protect the young forest from due to logging and insure forest ren

In the latter part of May, 1919, a foresters and practical lumbermen, at vitation of the State Land Commission three days in a tour of inspection of t and reported back to the land comm its findings and recommendations. On

committee's recommendations was that a topographic survey and timber estimate of all the state lands adjoining Big Payette Lake be made and that a definite policy for the development of the recreational features of these lands be compiled at the same time.

Accordingly, in the summer of 1919, under a cooperative agreement between the State Land Board and the School of Forestry of the University of Idaho, the School of Forestry put a party in the field for the purpose of making the studies recommended. As a result of these studies, the following recommendations, among others, were made: That the timber sales be managed so as to conserve the scenic features of the area as much as possible; that the area be made into a state park and designated as "Payette Lake Park"; that a Park Superintendent be appointed; that sanitary conditions be improved; that additional domestic water supply be provided; that a permanent survey be made which would locate and stake the lots, additions, roads and trails, mark the location of public camp grounds, wells, sanitary latrines, garbage pits, cooking fire places, public landing places and such other improvements as will be necessary for the development of this area as a permanent recreational center.

FLY SPECKS

"Ten little flies
  All in a line;
One got a swat!
  Then there were ——

Nine little flies
  Grimly sedate;
Licking their chops;
  Swat! Then there were ——

Eight little flies
  Raising some more;
Swat, swat! Swat, swat!
  Then there were ——

Four little flies
  Colored green-blue;
Swat, swat! (Ain't it easy?)
  Then there were ——

Two little flies
  Dodge the civilian—
Early next day
  There were a million!"

THE CUT-OVER LAND PROBLEM

By A. D. DECKER, *Land Agent, Potlatch Lumber Company,* Potlatch, I(

One of the greatest and most perplexing problems now confronting lumbermen, foresters, forest economists, conservationists, as well as federal and state authorities is the question as to the proper policies to adopt in the administration and economic usage of the thousands of acres of cut-over lands of the nation. It is axiomatic, of course, that all land should be put to its highest usage and on this judicious usage depends the welfare and prosperity of the country. With reference to cut-over lands much thought has been given but a great deal remains to be done in furthering its reclamation or reforestation. At this time, however,—as never before—much public attention is being given toward the reclamation of large areas of unproductive land having potential agricultural value and the reforesting of such areas as are typical forest land. Well defined bills embodying the above policies are now before Congress.

It is self-evident that in the determination of any land policy for any particular tract of land or forest the underlying problem is that of land classification. What constitutes potential agricultural land and what is true forest soil are muchly mooted questions among foresters, agriculturists and soil experts. Ultimate decision must be guided by the future economic needs to be served as well as the present demand. By improved methods of husbandry and more urgent demands on the soil our barren unproductive areas of today may be the garden spots of tomorrow.

In the three northwestern states alone it has been conservatively estimated that over one-half million acres are cut annually. It is perfectly safe to assume that at least one million acres are added to this area every three years. A survey of these lands throughout the country shows that among the thousands of acres of timbered lands that are being transformed annually into logged-off areas there is a large acreage of potential agricultural land capable of reclamation and development. These lands in several of the northern counties of Idaho, as well as in other timbered regions of the West, represent one of the greatest latent assets. The ultimate reclamation of these lands will, in a measure, offer a partial solution to the problems confronting us of increasing our supply of food stuffs perplexing condition of unemployn industrial unrest.

The gradually increasing demands soil of America can well be shown by at the late census reports. The c increasing population of the United S grown from 5,000,000 in the year 106,000,000 at the present time an this period has pushed in its westwa ment from the Alleghenies to the With this gradual but constant movement of our settlement the agi demands of the people have beer drawing harder and harder on our n The original settlements closely foll prairie lands along the river banks ar ally pushed upwards to the higher an upland soils. The late reports with to Idaho show an increase of 36.7 pe the number of farms during the pas In the complete list of states sho creases in new farms Idaho stands th ing 12.7 per cent of the total increas United States. Naturally the larger are found in the irrigated districts wl lands are being reclaimed, large farm and more intensive methods of ag practiced. The growth is not here alo ever. In Latah County, as in a fe counties having a large percentage proved wheat lands, many new farms ported but the consolidation of wh into large ranches outnumber the ne and no increase is shown in the repo Bonner County which is now Bon Boundary, and was almost totally a county, shows an increase of 357 Kootenai, another timbered county which Benewah was created, shows an of 525 farms since the year 1910 figures are conclusive proof of the de unimproved cut-over land and are a of the success being obtained in the mation. We have reason to believe mand for new land will continue to

From the standpoint of food pr there are numerous opinions with re the present-day need of encouraging tension of the farm area of the Agricultural economists contend—an

generally admitted—that the agricultural output of the United States could be doubled by thorough and more intensive farming methods without reclaiming an additional acre of raw land. To accomplish this, however, would necessitate double the available farm labor. Even though the demands for this increased production existed the supply of labor would be problematical. If transient labor were to be depended upon entirely our labor conditions would not be bettered. The division of our larger ranches into smaller farms would offer a partial solution since there are thousands interested in agricultural pursuit who are only desirous of working on land which they own or will eventualy acquire title to. Many of these are men of very ordinary means who cannot meet the swollen values in the better agriculturally improved regions. They prefer to join the pioneer class, buy unimproved land on easy terms and eventually acquire title to it.

At this time there is much agitation encouraging the young men and especially the ex-service men back to the farm. The Government encourages this movement and in furtherance of its policy has under consideration extensive plans and legislation for the securing of homes for these men. Several colonies and settlements for these ex-service men have been started which are meeting with varying degrees of success. The United States Chamber of Commerce has gone on record recently as favoring a national system of reclaiming waste area and provision for the work is embodied in the McNary Western reclamation bill now before Congress.

The McDevitt soldier settlement project, located in Southern California, is attracting considerable attention at this time. This tract constitutes 6,000 acres of reclaimed land recently put under irrigation. Many ex-service men enrolled in vocational agriculture at the various colleges throughout the country under the provisions of the rehabiliation act are now being transferred to the project. These men will be assigned a piece of land, receive instruction in agriculture and eventually gain title to the tract they operate. Directors of vocational training in the Northwest are looking into the practicability of such a plan on some of the logged-off tracts.

In any settlement plan the first problem of the State and private operators is to induce only country-minded settlers of the right kind to take up this land. They must then give them the proper inducements, guidance and cooperation in furthering their development work. To the man who has beeen struggling against adverse city conditions with neither money, equipment nor experience the task of subduing new land is a difficult one. If it were not, tho trend of settlement would not have been from the country toward the cities. The right kind of stuff has won and will win however, even under the adverse conditions. All localities, to a certain degree, have gone through the same stage of pioneering that the stump ranchers are enduring today. We have only to look over our better developed agricultural districts and look at the transformation and development during the past twenty years. Those farmers who were then combating stumps, adverse markets and poor transportation and have stayed with their land have been transformed from struggling interest payers to money loaners.

In the appraisement of these lands all factors and conditions affecting the land must be given careful consideration and a final price set at such a figure that a reasonable return of interest on the capital invested can be expected after all costs incidental to the subduing of the land have been considered. Since practically all settlers are not in affluent circumstances, most of the lumber companies and large owners of logged-off land have adopted the policy of selling these lands on easy terms covering a period of ten years with a low rate of interest on deferred payments. These lands sell at prices ranging from $10.00 to $20.00 per acre for the better lands. Lands suitable for grazing are sold at prices ranging from 50 cents to $10.00 per acre. Purchasers of this class of land have been having varying degrees of success throughout the West depending largely on their ability, initiative and methods pursued. Those familiar with the problems to be met generally discourage the process of a large outlay for teams and equipment at first. In the process of subduing land there is an intermediate stage between waste and complete reclamation where the land can be utilized as pasturage and made to produce the first year. This is accomplished by burning the brush and slashing late in the autumn and seeding the land to timothy and clover. This system lends itself admirably to the dairy and poultry business and is equally good from the standpoint of meat and wool production. This pasturage system greatly improves the land by the addi-

tion of nitrates to the soil. By this system the land is soon put into a state of production and the stumps can generally be worked out without a large expenditure. Such a deferred system of clearing gives the settler an opportunity to avail himself of additional employment in the camps and lumbering operations and at the same time gradually gain his objective of complete reclamation and eventual ownership.

After a few years improvement work on the property the land values rise so that the debt may be taken over by the Federal Land Bank of the district on its usual basis of loans, equal to fifty per cent of the sale value of the farm checked up by its earning capacity. This system gives the settler a very low rate of interest and extends the time of payment over a period of from thirty to forty years under the amortization plan of retiring interest and principal. Many settlers avail themselves of these loans.

Up to this time the future use of cut-over land with potential agricultural value has only been discussed and nothing said regarding the problems incidental to the administration of the vast acreage of typical forest lands suitable only for grazing purposes or reforestation. In the latter class falls the larger percentage of cut-over lands in the West. If this forest land were owned by the public the administration for future forest crops would be comparatively simple—but such is not the case. When we come to consider that 97 per cent of the total amount of timber and other wood products cut and used in the United States are taken from privately owned lands; that less than 2 per cent of the sawmills of the country are operated on public forests, and further that the private owners hold four-fifths of the standing timber, one realizes that the large bulk of the cut-over land is privately owned. Any policy, therfore, dictating the management, protection and reforestation of these lands must have the support of the majority of the private owners. It is not supposed that an owner can be compelled to develop and perpetuate his timber land at a financial loss. If reforestation on privately owned land is desired, concessions must be made by the State and the enterprise made to pay, as it has done in other countries.

It is readily seen that this land in the cut-over condition is not profitable to the State, community or the individual owner. It pays but little in taxes, is a great fire risk and is rather a menace than an asset to a community. The carrying charge on land in this is a dead expense to the private own only chance for revenue is throu grazing fees. With the constantly taxes and expenses of fire protectio ural policy to pursue is to dispose of as soon as possible. However, at progressive lumbermen are entirely pathy with sound forestry policies ready to encourage, eager to initiate ious to participate in any program lessen the future possibilities of for tion. The very stability of the ind pends upon such action. Practically ators feel, however, that under exist fire risks, markets and business they cannot change their present These lands were purchased to ex timber with no thought of securing crop and the mere appeal in beha public good does not interest the sto to the extent that he cares to invest h in such a long time investment wit certainties. As stated before it must to pay. Under these conditions, the is reasonable to assume that the pr forestry must be made a function of and Federal government to a large

It is a commendable fact, howe most of the cut-over lands of the embodied in well organized and e administered timber protective ass which in cooperation with the State eral authorities have these lands un system of patrol. As a result of car tection large areas of cut-over lands foresting naturally. Experiment stat ords show that in the case of white Douglas fir—our two most valuable species—second crops may be secure ally by careful brush disposal and tection. The germination starts fr seeds stored in the forest floor which fertile for several years. These seed protected from heavy fire, however. protective associations, however, pay l attention toward the protection of areas but with additional funds more methods can be adopted. Effective f tection is the keynote of any refor plan.

The extent to which private capital interested in the administration of th over areas for reforestation is as yet p atical. As an inducement, however, legislation is now proposed by Congr several states to cooperate with the

owner in a forestry program. Realizing that confiscatory taxes is one of the great hindrances in interesting private initiative in reforestation, some states now propose tax reforms by which an annual tax will be levied on the land only and all taxes on growing timber will be deferred until cut. The timber tax would then be figured as a certain percentage of the market value of the stumpage. Others propose legislation whereby all taxes both on land and growing timber would be exempted until the timber is cut. The total tax would then be levied against the timber. In this connection it is interesting to note that California now proposes to amend its Constitution to enable the separate taxation of forest land and timber on the land. The specific resolution now before the legislature provides that "the legislature shall have power to provide by general and uniform laws for the taxation of land, on which there is standing young timber or mature timber, separately from the timber and for the taxation of the timber at the time it is cut or utilized only."

In the furtherance of any national policy a broad program must be initiated providing for the cooperative administration of public and private forests. Holdings will have to be consolidated and exchanges made between owners for administrative reasons. A very comprehensive national forest policy embodying the general land exchange plan and designated as the Snell Forestry Bill is now before Congress and will undoubtedly receive favorable action. This bill provides for a national forestry policy covering such features as cooperation between the federal government, states and private owners in fire protection and forestry measures. It further provides for a general timber survey and study of the requirements of the nation, arranges for forest research and investigations including the study of forest taxation, affords funds for the reforestation in the national forests and authorizes the acquisition of lands by exchange when clearly in the interest of the public. This bill has been referred to as "the greatest forward step in forestry in many years". It is receiving the support of practically every interest by virtue of the fact that the legislation contained therein is sane, conservative and fair to all concerned.

Such legislation will enable large acreages of cut-over lands suited only for tree growth to be acquired and included in our national forests for reforestation. It will further encourage fire protection on all forest areas. These accomplishments together with the centering of the attention of the public upon the importance and need of forest conservation should have a profound beneficial influence on a forestry program with reference to these one time forest areas which are now lying idle and unproductive.

THE SCHOOL IN 1920-21

By F. G. MILLER, *Dean*

The current year has again shown substantial growth in the School of Forestry. This is reflected first of all in the fact that the enrollment this year represents an increase of about 60 per cent over that of last year both in the number of resident students majoring in the School, and in the total number under instruction in forestry.

Enrollment for the Past Two Years.

	1919-20	1920-21
Students in Regular Curricula	37	55
Students in Ranger Course	6	14
Students in Correspondence Course	19	45
Students from other departments	34	38
Total under forestry instruction	96	152

The national character of the School is indicated by the fact that the 69 resident students majoring in forestry the current year come from 15 different states, and if the 45 correspondence students are added, we find 25 different states and Canada represented, facts which show that the School is becoming widely known.

Additional Instructor.

The rapid growth of the school made it necessary to add an instructor in forestry January 1, and through the courtesy of the U. S. Forest Service the University secured the service of Mr. J. B. Taylor, Forest Examiner, for a four months' period. Mr. Taylor filled the place so acceptably as to cause general regret that he could not see his way clear to accept a permanent appointment. The position will, however, be filled before the opening of the university next fall.

Special Lecturers.

Other assignments from the Forest Service included J. A. Fitzwater, Lecturer on Forest Management; C. K. McHarg, Lecturer on Forest Administration; and C. C. Delevan, Lecturer on Forest Protection, each giving a series of eight to ten lectures, all of which were highly instructive, and proved to be a feature of the year's work.

Courses for Federal Board Students.

At the request of the Federal Board for Vocational Education, the school is offering forestry courses especially designed to meet the needs of men receiving instruction under the Rehabilitation Act. The courses cover two years and are arranged in units consisting of approximately nine weeks each. About 25 men are taking advantage of these courses this year, and another contingent will enter next fall. Their objective is primarily the position of forest ranger.

Reconnaissance Studies.

In response to a request from the Department of Public Works, a reconnaissance study was made last summer of Heyburn Park, and recommendations have been made for the development of the recreational features and for the management of the timber resources. The school also cruised and mapped, in the summer of 1920 over 18,000 acres of state timber land, mostly that of the University, in Clearwater County. It is planned to make simil of the rest of the University timber in the near future. These recon studies have been an important fact development of the school and have emphasize the state wide characte field.

Research.

With due appreciation of the impo research in forestry, the University h ed a policy whereby the forest facult given the summer months for worl character. The work of instruction properly continue to occupy the majo

CLASS IN TIMBER ESTIMATING IN THE FIELD

of the time of the faculty during the U year. However, it is hoped that enou will be available outside of class-roon which with the summer period will en members of the faculty to give appro one-third of their time to research wo

The coming summer Dr. Schmitz main at the University to continue searches in forest products, while Pro and Dean Miller will cooperate with tl Forest Service in a study to determ minimum silvicultural requirements tc forest renewal following logging ope Dr. Schmitz has been permitted tempoı of a separate building as a Forest F Laboratory, and equipment will be i this summer. The building has concret

and is otherwise so constructed as to answer quite well till a permanent Forest Products Laboratory can be provided. An additional laboratory for forest engineering and mensuration will be fitted up in Morrill Hall this summer.

Student Employment.

Practically the entire student body will be employed in some phase of forestry work this summer, the most of them with the U. S. Forest Service. They will not only acquire much practical experience in this way, but will earn a considerable part of their expenses for the coming year. There is thus emphasized the importance of attending school where the forests are found. Situated near extensive national, state, and private forests, and large logging and saw mill operatons, as the Idaho School is, there is afforded unusual opportunity for summer employment, and the expense to the student of getting to and from the field is slight.

Prof. Behre and Dr. Schmitz Promoted.

In recognition of their very efficient service since identifying themselves with the school, Prof. Behre has been advanced to the position of Associate Professor of Lumbering, and Dr. Schmitz to that of Associate Professor of Forest Products.

ACTIVITIES OF THE ASSOCIATED FORESTERS

The Associated Foresters of the University of Idaho have completed another successful year of their history. The plan of holding regular meetings once each week during the afternoon was abandoned in favor of biweekly meetings in the evenings because of conflicts in schedules of classes. These evening meetings combined the social features of the special meetings of last year with the business and educational features of the regular meetings.

In addition to the regular meetings, several special meetings were addressed by men prominent in the lumber industry or the U. S. Forest Service during the year. The year's social activities included a dance and a banquet, detailed accounts of which may be found below. One of the special events of the year was a two reel motion picture depicting the methods of creosoting wood for various purposes, secured thru the courtesy of the Barrett Company. The attendance at all the meetings was excellent and the success of the club will be assured as long as a good attendance can be maintained at the meetings.

The officers who led the club through the year were: President, J. P. Drissen, '21, Harrison; Vice President, J. W. Farrell, '22, New Meadows; Secretary-Treasurer, Edward T. Nero, '22, Moscow.

The following calendar of the club's meetings gives the speakers and the subjects of their addresses.

November 18. Prof. F. W. Gail, "Meterological Studies of the Distribution of Tree Species near Moscow, Idaho".

December 2. Prof. H. C. Dale, "Factors Affecting the Downward Trend of Commodity Prices".

February 4. J. B. Taylor, "The Forest School at Edinburg University, Scotland".

February 9. N. H. Coleman, President, Loyal Legion of Loggers and Lumbermen, "Present Conditions in the Lumber Industry".

February 11. Fred Morrell, District Forester, Missoula, Montana, "Problems of Personnel in Oranization". H. R. Flint, Forest Examiner, Missoula, Montana, "Fire Protection Plans for the Coming Season".

February 14-19. District Forest Inspector, J. A. Fitzwater, of Sandpoint, Idaho. Ten lectures on timber sales and working plans for the Pend d'Oreille National Forest.

February 31-March 5. C. K. McHarg, District Forest Inspector of Coeur d'Alene, Idaho. Series of lectures on policy and activities of the U. S. Forest Service.

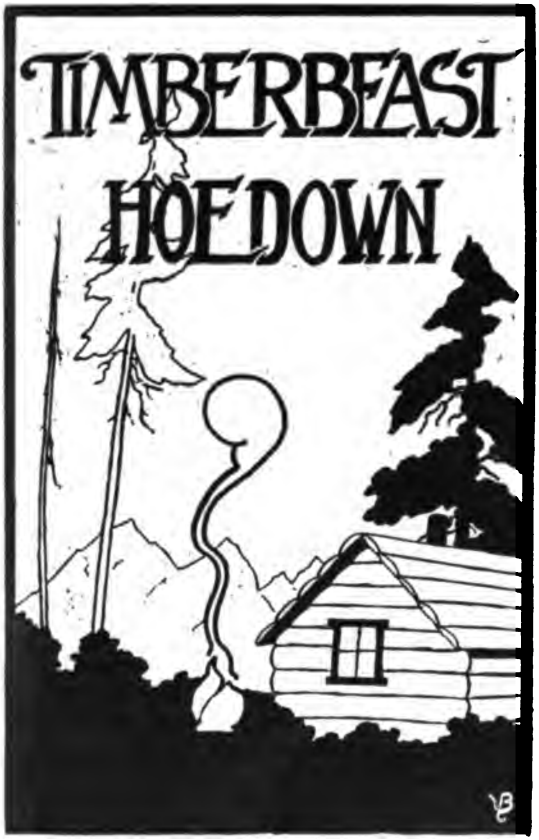
March 7-9. C. C. Delevan, Fire Assistant, Coeur d'Alene National Forest. Five lectures on "Fire Protection".

March 12. Thomas Jackson, Logging Engineer, Rutledge Timber Co., Clarkia, Idaho, "Wire Rope for Logging Use."

Morch 17. C. L. Billings Land Agent, Edward Rutledge Timber Company, Coeur d'Alene, Idaho, "Land Exchange Legislation".

April 28. Prof. J. W. Barton, "Applying Psychology to Industry". Motion Pictures, "Preservative Treatment of Wood".

May 25. W. D. Humiston, Assistant General Manager, Potlatch Lumber Company, Potlatch, Idaho "Fire Protection to Save our Forests".



The fifth annual dance of the Associated Foresters, known on the campus as the "Timberbeast Hoedown", took place on M the University gymnasium. As pred year when circumstances forced the to put on a civilized dance and allo ance in dress suits and boiled sh year's affair was a reversion to typ the Timberbeasts were on hand in fu except that hobnailed boots had to b at the door in deference to the t floor.

Well in advance of the event, the beasts had gathered their forces and in from Moscow Mountain an abun evergree branches which were used ate the hall, and transform the pro of gymnasium apparatus into a verit of verdure.

The programs were novel souvenirs tracted the admiration of all who at consisting of thin pieces of Idaho wh upon one side of which the accompar was reproduced in its exact size and other the order of the dances was under a modified "Form 820-U. S. F.

The dance was one of the most s of the college year in point of attend "pep" and maintained the enviable which the Tmberbeasts have made f selves in college circles. The patr patronesses were Dean and Mrs. Mill and Mrs. Behre and Prof. and Mrs. Scl

FIFTH ANNUAL BANQUET

The Associated Foresters of the School of Forestry of the University of Idaho held their fifth annual banquet on Wednesday evening, March 16, at Lindley Hall, the University's new dormitory building. The affair was attended by over fifty of the students, alumni and faculty and guests of the School of Forestry and a most interesting and valuable program was enjoyed by all.

The list of speakers included A. H. Upham, newly appointed president of the university, who spoke on "Forestry and the University". J. H. Forney of Moscow, the university's first president, who congratulated the School of Forestry on the remarkable progress which had been made in the last few years; J. P. Drissen of Harrison, President of the Associated Foreters, who outlined the activities of the Forest Club; A. D. Decker, an alum with the Potlatch Lumber Company latch, Idaho, who discussed the train forester; L. F. Parsons of Moscow, E Secretary to the President of the Ur who pointed out the great influence th of Idaho had exerted upon the develo the state and stated that they were c ing one-fourth of the cost of maintai state and the university; Ben E. Bush cow, State Land Cruiser, whose to "Forestry and the State" and Chas. L of the Edward Rutledge Timber Com Coeur d'Alene who discussed forestr lation.

The policy of the state board of la misioners in regard to the state lar stated by Mr. Bush to aim to prote

lands and conserve their productive capacity and potential value with the object of ultimately turning them over to the U. S. Forest Service in exchange for National Forest timber or assignable timber certificates of equal value.

Mr. Billings stated that the forestry bill which had been introduced in the recent session of the state legislature and supported by the University, the U. S. Forest Service, the Protective Associations and the lumber manufacturers had failed because of lack of confidence and understanding on the part of the general public. He stated that it was the duty of every man with forestry training to help educate the public to a fuller realization of what forestry means and of its economic importance to the nation and he called on each man present to shoulder his share of the responsibility in furthering the forestry movement.

MOVEMENT OF STUMPAGE PRICES IN THE LAKE STATES AND THE INLAND EMPIRE

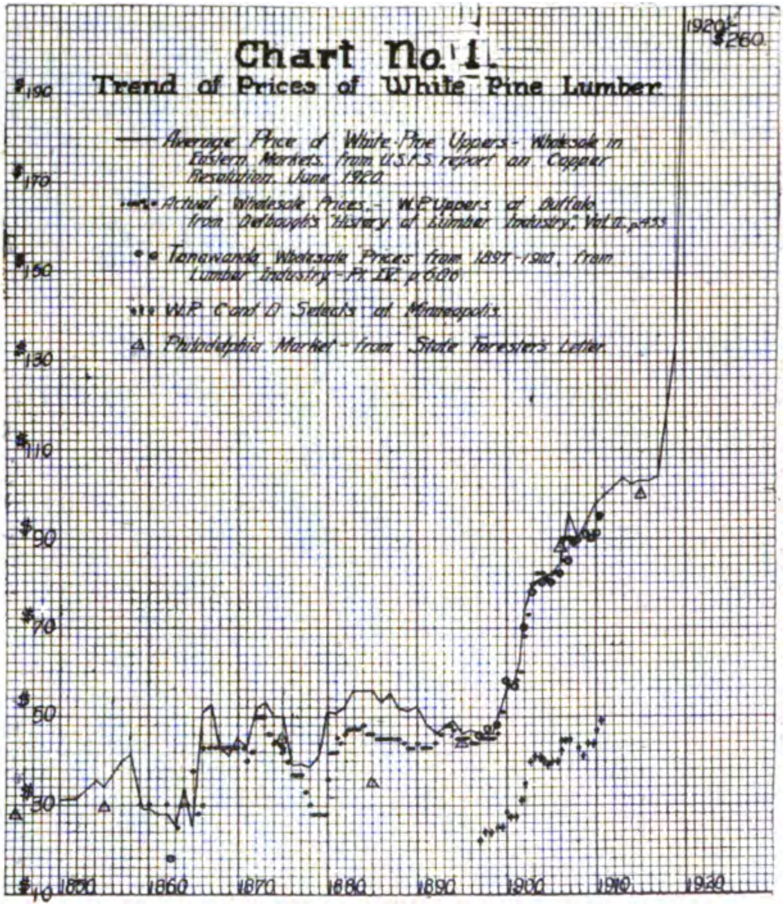
By C. EDWARD BEHRE, *Associate Professor of Forestry*

Within the last year several valuable contributions have been made to our knowledge of the economics of lumber prices which enable us to forecast with some assurance the probable general course of prices for the future. Professor R. C. Bryant of the Yale School of Forestry in a paper on "Lumber Prices" in the Annals of the American Academy of Political and Social Science for May, 1920, pointed out that past movement of lumber prices had been in cycles corresponding to the movement of the center of production from one section of the country to another. At the beginning of these cycles, the center of production is moving to a point relatively distant from the center of consumption and the prices of lumber tend to rise rapidly and diverge markedly from the level of the "all commodity" group. Toward the end of the cycles, the movement of the center of population westward nearer to the center of lumber production and further from the point of manufacture of the other commodities tends to retard the rise of lumber prices and bring the level of the "all commodity" group up to it. Toward the end of the cycles, moreover, lumber from more distant regions begins to compete with that near by and this interregional competition tends to keep prices down until the exhaustion of the supply in the nearer region removes the competition and enables the producer in the more distant region to pass on to the consumer increased freight rate and production charges which he has been shouldering to some extent in order to market his product.

Such a cycle was observed from 1860 when the lumber industry of the northeast failed to meet the demands of the country and the center of production moved to the Lake States, until 1880, when the lumber industry in the Lake States was at its height, and again from 1880, when the center of production moved to the southern pineries, until 1916. All indications point to the opening of a third cycle now that the center of production is moving to the northwest.

The periodic fluctuation of lumber prices has also been ably discused under the head of "Forest Depletion and Lumber Prices" by Forester W. B. Greeley in the U. S. Forest Service Report No. 311 to the Senate, commonly known as the "Capper Report," and in a paper on "The Movement of Softwood Lumber Prices in the Middle West," by O. M. Butler of the U. S. Forest Products Laboratory at Madison, Wis., which appeared in the Timberman for Jan. 1921. The cycles described are shown graphically for white pine upper grades on eastern markets in Chart No. 1.

From these studies we can conclude that when the instability of the reconstruction period is passed a new level of lumber prices will be established which will hold with only slight fluctuations for a considerable period into the future while the level of the "all commodity" group may be expected to continue to rise acording to general economic laws. This comparatively level period will not be followed by another steep rise as in the past but a more gradual rise of prices following more closely the general trend of the "all commodity" group may be expected because the last great reservoir of virgin timber has been tapped and interrregional competition will not operate as in the past. R. B. Goodman be-



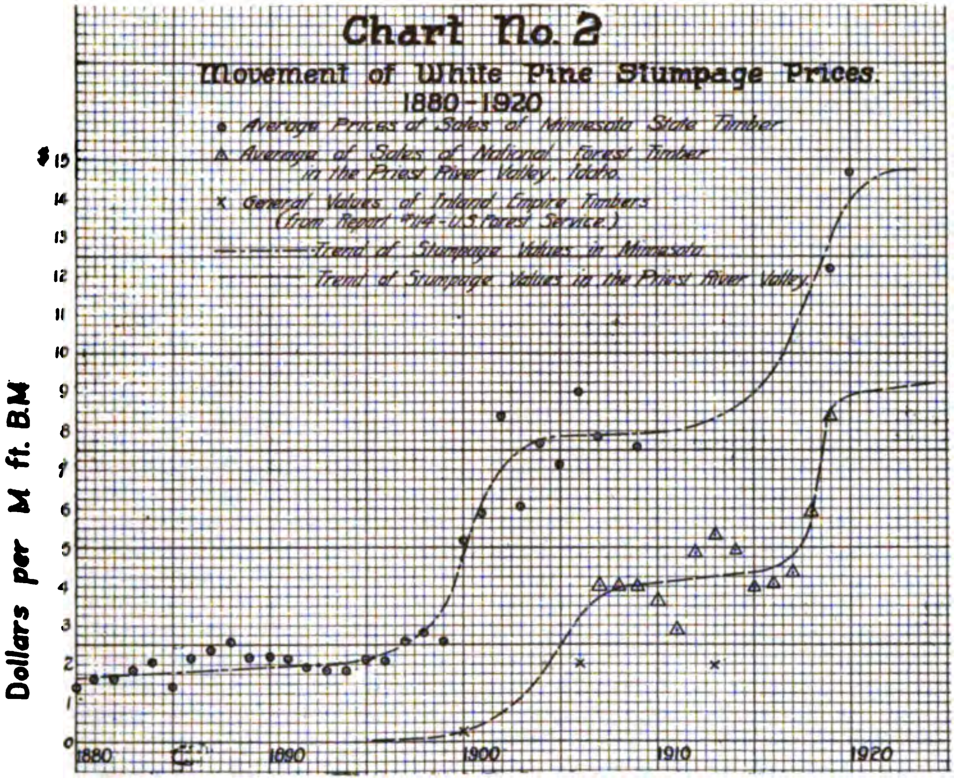
lieves that the future advance of lumber will raise its position in the commodity scale at the rate of 1 per cent per year.

It is the object of this paper to analyze the relation between these movements of lumber prices and stumpage prices in different sections of the country in order to indicate what may be expected in the future and how the conditions as we find them may effect the future of forestry in this country.

Reliable information on the movement of the average stumpage prices in any region is quite scarce. However, general information secured from various publications and letters from the State Foresters of some of the eastern states are interesting in indicating possible and probable future trends in stumpage levels. The average stumpage prices received from the sale of state white pine timber in Minnesota from 1880 to 1920, and the average of sales of National Forest Timber in the Priest River Valley, Idaho, since 1 shown in Chart No. 2.

The data compiled by D. T. Mason in port on the Lumber Industry in the Inla pire show a general decline of stumpag on the national forests in that region b 1907 and 1915 but since that time price advanced rapidly to more than the 1907 Mason's data show an average st price of $4.00 per M in 1909 on sale more than 25 per cent green white pine falls to $2.00 in 1915. At present, the age price of white pine in the Inland ranges from $6.00 to $11.00 per M an to 1900, stumpage had almost no valu chases of large areas being made at averaging $0.25 to $0.50 per M.

Mr. W. O. Filley, State Forester of Co cut, states that stumpage for white p Southern New England had advanced $1.00 per M 30 years ago to $10.00 to



at present. The class of material being sold at these prices is small second growth stuff practically all of which is cut into round edges box boards.

J. H. Foster, State Forester of New Hampshire, states that stumpage prices in that state have increased from $2.00 per M to an average price today of $8.00 to $12.00 per M for a greatly inferior grade of pine.

In Minnesota the following average stumpage prices are given by W. T. Cox, State Forester:

1870-1880	$2.00 per M
1880-1890	3.00 per M
1890-1900	3.00 to 5.00 per M
1900-1910	5.00 to 10.00 per M
1910-1920	10.00 to 15.00 per M

Gifford Pinchot, State Forester of Pennsylvannia states that even as late as 1860 to 1875, large quantities of white pine timber were sold at 50c per M stumpage in Pennsylvania while it is fair to assume that the present average stumpage price of virgin white pine in that state is around $60.00 per M. But in regard to the way in which the rise in stumpage took place Mr. Pinchot says, "The increase in stumpage prices did not keep pace with the increase in market prces. It lagged behind and it was not until the virgin supply of timber was practically exhausted that a marked increase took place in stumpage prices."

The interesting points that may be deduced from Chart No. 2 and this information are that the price curvé for the Priest River Valley is similar to that of Minnesota sales but from 10 to 15 years behind it, that second growth box board material in New England is bringing nearly twice as much as the best of the virgin timber in Northern Idaho, and that marked stumpage increases in eastern states took place following the removal of the center of production to a more distant region.

The influence of the cycles of the general lumber price movement is reflected in the data available on stumpage prices. The sales of Minnesota state timber were at practically a constant price level from 1880 until 1899, which corresponds to the period of level prices of white pine lumber indicated in Chart No. 1. Then Minnesota stumpage prices took a rapid rise and fluctuated between $7.00 and $9.00 per M from 1902 until the end of the

record in 1909. The figures quoted by the Minnesota State Forester, however, show that within the past decade another rapid rise in price has taken place corresponding to the beginning of the third cycle in the general price movement of lumber.

The data on Priest River, Idaho, sales follow the same tendency. Before 1900, stumpage in the Inland Empire was practically worthless, very few sales being recorded, and from 1900 to 1906 there was a rapid rise which Mason attributes to the general business prosperity of the country during that period which was marked by the rapid buying of stumpage in the Inland Empire. This rapid buying of stumpage in the West, however, was also directly the result of the exhaustion of the supply of the Lake States, and so comes back to the original correlation of the stumpage price movement with lumber price cycles.

From 1907 to 1917 prices fluctuated about $4.00 per M, becoming considerably lower as pointed out by Mason in the period of depression and overproduction between 1909 and 1915. Naturally enough, the level of Priest River prices during the second cycle was lower than the Minnesota price level, because of the relative inaccessibility of the region. With the coming of the new cycle, however, differences in price levels between the two regions will probably be lessened by the movement of the center of population and consumption westward, the relocation of wood using industries in the West and the reduction of the relative difference in the length of haul to market from the two regions. That this may be expected, is further indicated by the fact that at present, prices in the Lake States are about the same as prices in New England, whereas at the beginning of the second cycle they were much lower, just as prices in the Inland Empire are now much lower than those in the Lake States.

In order to understand what the developments in the future will probably be we must consider the relation between stumpage prices, lumber prices and the accessibility of the timber. The price of lumber in any market is directly dependent upon the cost of getting it to that market and in this cost will be included the cost of logging just as much as the freight charges on the manufactured products. In other words, lumber prices will go up when the cost of logging is increased by the necessity of going further into inaccessible timber, because stumpage values will not go down except as they may be influenced temporarily by excess mill capacity and potential over-production, which Mason points out caused the decline of stumpage prices in the Inland Empire between 1909 and 1915. Thus, altho the stumpage price in any locality is figured from the average selling price of lumber less the costs of production, in reality it is dependent upon the cost of the marginal product of zero stumpage value because the price of lumber is determined by the cost of getting to the market the most inaccessible timber which must be logged to fill the demand of the market. This relation was very forcibly discussed by R. B. Goodman in a lecture on "The Price of Lumber" before the Yale School of Forestry, 1920.

Thus, when between 1890 and 1900, the exhaustion of the supply of white pine in the Lake States made it necessary to log the relatively distant timber of the southern pineries and Inland Empire, lumber prices in eastern markets rose to a point determined by the cost of getting the southern and western timber to them, and the stumpage prices on the remaining stands of local timber in the Lake States took a rapid rise, because they were then relatively much more accessible than before. In the same way, before this took place, stumpage prices in the Lake States were kept rising with the general rise of other commodities by the fact that the accessibility of the stands within that region was decreasing and exerting a restraining influence on the rise of prices and because interregional competition was tending to hold lumber prices down. Now again prices on eastern markets are pushed up by the moving of the center of production to the northwest, and with this new move, the remaining stumpage of the Lake States, altho it was all inaccessible in 1880, is again placed in a position of much greater advantage, and so takes a new bound to the present levels. For the future, it would seem that stumpage prices in the Lake States and the East will not take another rapid rise for the same reason that lumber prices will not do so, but that a gradually increasing advantage in relative position will accrue to stumpage in the Lake States and therefore a gradually increasing price may be expected. This increase will take place as the price of lumber is forced up by the gradually increasing cost of the marginal product from the more inaccessible areas in the West.

At the same time that stumpage for the

region in general is enjoying this increasing advantage, individual stands within the region itself and individual trees within given stands are reaching the point where they can be profitably harvested because the marginal product is coming from every region and as R. B. Goodman puts it, "zero stumpage is found in the most remote tree or the most inaccessible tree, or smallest sized, or the poorest quality tree of every region now being logged." This means also that new stands which may be grown in this region on the more accessible areas, which can be harvested at much less cost than the marginal product described by Mr. Goodman, will have a margin between selling price of lumber and costs of production sufficiently large to cover all the costs of establishing, protecting and carrying them to maturity. Therefore as each increase in price bid for lumber creates additional supply by making it possible to market lumber bearing higher costs of production and transportation, or timber of poorer quality, it also justifies the expenditure of an increasing amount for the production and protection of new stands and places forestry on a more profitable business basis for the private owners.

That then marks the probable tendency in the East as determined by conditions in the West, but how will stumpage prices move in the West? Mason shows that because of the enormous area of timber land per capita in the Inland Empire, this section must always be an exporting region, and therefore its stumpage prices will be determined by the price of lumber on markets of the Mississippi Valley. The studies of lumber prices showed that lumber prices will remain fairly constant for a period after reconstruction and then will gradually increase because of the increasing costs of getting the more inaccessible timber to the mill. We have assumed that this would be necessary to keep stumpage from falling or in other words, the stumpage in the West would probably remain about on the same level as at present. Mason points out also that stumpage values in the West will be held relatively low by potential overproduction in the industry, and by the high freight rates which it will always have to pay to markets. Mason did not foresee the recent rapid rise in prices, altho he allows for a probable increase of Inland Empire stumpage to $8.00 to $12.00 per M, not considering what fluctuations may take place in the dollar standard. The recent rapid rise may be attributed to two reasons: first, another period of stimulated demand for stumpage similar to that of 1905, caused by the decline of the southern pine region as the lumber producing center of the country, and by relatively high profits in the industry attracting new capital into it and creating additional competition for the raw material; and secondly, by the decrease in purchasing power of the dollar which has caused a rapid rise in all commodities in this period. This period of rapid increase has now been passed, however, stumpage has fallen somewhat and when readjustment is completed the factors will be working in the same way as described above and outlined by Mason, so that we may look for nothing but slight increases in stumpage in the future, which will be caused more by changes in the gold supply of the world, and the standard of the dollar than by scarcity of timber.

But this statement which applies to average stumpage prices for the region, does not alter the general proposition of the difference in position of individual stands and individual trees within the stands of the region. Therefore the future will find inferior trees now unmerchantable coming into the market and also second growth stands of no present value, being logged with as much profit as the then remaining virgin stands in less favorable positions. In addition growing trees as a crop in the more accessible areas will become more and more attractive to capital because the costs of growing the crop will offset the increased cost and greater investment in improvements required to log the more inaccessible virgin stuff which will in turn become poorer in quality and smaller in size, and therefore more comparable to the second growth, as logging recedes up into the mountains.

But in the Capper Report it is pointed out that lumber of the same grade is selling at a much lower price in forested regions close to the source of supply than in the distant markets. If this is so will not the second growth as it becomes merchantable have to sell at a lower price than the virgin timber imported from distant regions? In answer to this it can be said that in the importing regions the second growth will not have to sell in this way unless its volume is sufficient to transform the locality once more from an importing to an exporting section because the price advantage which forested regions now have over

non-forested regions holds only while these regions are exporters with abundant supplies of raw materials in which growing costs have not figured. By the time this easily reached virgin supply is exhausted from the last of our exporting regions the cost of the marginal product will have advanced to the point where growing of forests as crops will have become the general rule throughout the co ber production will not be concentra one or two regions but will be quite distributed and the price of lumb determined not by the marginal defined at present but by the cost o protecting and carrying the new maturity under the most adverse required to meet the demand of the

SOME UNUSUAL WOOD DERIVATIVES

By HENRY SCHMITZ, *Associate Professor of Forestry*

During the last few years, we have grown quite accustomed to hearing about unusual products made from wood. For example, we are no longer surprised to walk into an operating room and see the doctor use a wood pulp substitute for absorbent cotton. And I do not use the word substitute in any other sense than to indicate that it is used in the place of absorbent cotton. It is in no way inferior to absorbent cotton and even excels the latter product in its rate of absorption and in the total absorbing capacity.

We are no longer surprised to find that the artificial fibre silk hose which we wear may be a product of wood cellulose. Even dresses, shirts and many other articles of wearing apparel have their ultimate origin in some stately tree of the forest. It is not claimed that fibre silk is superior to silk, it having only about 40 per cent of the wearing qualities of the genuine article, but it is much cheaper, looks very well and is easily dyed.

Then, too, it is quite common to read of paper underwear, and even of outer garments made more or less from paper pulp. Paper rugs adorn our floors and we only too often walk on them with the paper heels of our shoes. Wood flour, a substance made by finely grinding wood is an important constituent of linoleum. Paper wash lines are very common and indeed superior to all others, their surface being much smoother and consequently easier to keep clean. These lines are, of course, waterproofed. The packages we receive from the grocer may be wrapped with the aid of paper twine and, if we can take as true that which we read about conditions in Germany during the war, these packages may have contained some form of wooden food.

If a hardwood such as beech, maple, or birch be heated in a closed vessel in the absence of air and the gases which are evolved passed through a condensor severa are formed. First, a gas is obtaine inflammable and which may be used stitute for coal gas; secondly, a liqui ed; and lastly, a charcoal residue This charcoal is used in the manu steel, it may be used in medicine, an even feed it to our chickens.

We are primarily interested in obtained, for this contains the begi an almost infinite number of chem stances. To begin with, the liquid co aqueous and an oil fraction which n be separated. If ordinary lime is a the mixture be redistilled, the woo may be separated from the mixtu substance known as calcium acetate Some twelve gallons of alcohol ma tained per cord of wood and this pr be referred to later.

Let us confine ourselves to the cal tate and see what can be done with be treated with an acid, acetic acid obtained. As is well known, ordinar is merely a dilute solution of ace Acetic acid is also an important orga ical. If the acetic acid be treated w nary ammonia, ammonium acetate i which is used in medicine as a When ammonium acetate is distilled another important organic chemical i When acetic acid is treated with th iron salt, ferrous acetate is formed used as a mordant in dyeing. Alum tate may also be formed directly substance is used in calico printing, i and in medicine as an astringent. By the acid with metallic lead, lead ac sugar of lead is formed. This is poisonous salt and also finds applicati treatment of various ailments such a ects of poison ivy or poison oak.

Sodium acetate may be still further treated with phosphorous oxychloride and acetic anhydride is produced. Acetic anhydride is a chemical reagent of great importance.

If now we refer back to calcium acetate and heat it, an important liquid known as acetone is produced. Acetone is extensively used as an organic solvent, for example to remove spots from clothes, in the manufacture of smokeless powder, and as a solvent in the manufacture of varnishes. It is also interesting to note that during the war acetone was practically the only solvent used in the manufacture of aeroplane dope, which is nothing more than an acetone solution of cellulose acetate, also a wood derivative.

Acetone may be treated with ordinary bleaching powder and chloroform is produced. Besides being a valuable anesthetic, the liquid is also an important organic solvent. Then, too, acetone may be heated with iodine and lye, and iodoform, a very important disinfectant is produced.

Let us now consider briefly the case of methyl or wood alcohol. Wood alcohol is, of course, extensively used as a fuel and in the manufacture of paints, varnishes and paint and varnish removers. It can also easily be oxidized with formic acid and formaldehyde, an important preservative and disinfectant, produced. Going a step further, formaldehyde may easily be converted into para-formaldehyde, also an important disinfectant. Methyl alcohol is used in the manufacture of coal tar colors as a denaturent for grain alcohol, and it may be converted into methyl ether which is extensively used in the manufacture of ice.

The oily fraction obtained in the original distillation of the beech wood also has some uses. In the crude form it is, to a limited extent, used as wood preservative, as fuel, or it may be separated into its component parts, one of which is the well known beech wood creosote.

If a resinous wood such as pine wood is heated as previously discussed, little or no wood alcohol or acetic acid is produced, but substances of an entirely different nature. One of the more important products is oil of turpentine, which is most widely used in the manufacture of paint. At the present time, however, considerable quantities of camphor are synthesized from turpentine. Oil of turpentine is also quite widely used in medicine.

After the turpentine is removed from the distillate, wood creosote and wood tar remain. These substances also have enormous economic value. Mixed with various pigments, they form the common shingle stain; used directly, they act as wood preservatives, embalming fluids, or tree sprays, and have many other similar uses. They may be, and are, also used in the flotation process in the separation of metals such as zinc, nickel, lead, etc.

Ordinary wood sawdust may also be treated with acid and a part of the cell wall substances are converted into fermentable sugars. The acid is neutralized, the sugar solutions concentrated and fermented. Thus ethyl or grain alcohol may be produced from wood with a yield of eighteen to twenty gallons per ton of wood. The sawdust residue also has a value as a cattle food and recent tests show that they not only like it, but get fat on this food.

Starting with ethyl or grain alcohol, an almost infinite number of substances may be produced. To go through this list, would be more or less repetition of that which has been said before and it will be sufficient to merely enumerate the most important of them. Treating it with sulphuric acid, ethyl ether is produced, which is an important anesthetic, and used in medicine as Hofmann's drops, for ice machines and in the manufacture of collodion or "new skin". Grain alcohol may be oxidized to form acetaldehyde and then para-aldehyde used in medicine as a soporific. Indirectly chloral hydrate, aslo a soporific and antiseptic, may be made. An endless list of other products may also be formed.

If wood cellulose be treated with nitric and sulphuric acids, cellulose nitrates or gun cotton are produced, which recent tests have shown to be quite equal to that produced from cotton. Cellulose nitrate is not only the basis of smokeless powder, but it is also the basis of celluloid, artificial ivory, artificial leather and numerous other important products.

Thus, it can easily be seen to what an extent we are dependent upon the forest for many substances not ordinarily associated with it. The reason this fact is so often overlooked is because of the great number of steps between the raw product and the ultimate substance. However, were we denied all the products obtained either directly or indirectly from wood, we would immediately realize to what extent our daily activities are associated with the forest.

TIME STUDY OF MOTOR TRUCK LOGGING OF YELLOW P

By J. P. DRISSEN, '21

During the summer of 1920, the writer made a detailed study of the operation of motor trucks for hauling logs. The operation studied was in a yellow pine forest near St. Maries, Idaho, in timber averaging 5.82 logs per M. A 3 1-2 ton Day-Elder truck without trailer was used to haul the logs from skidways in the woods over an ordinary country road to a landing on the river bank. The object of this time study was to determine accurately just how much an auto truck will haul at different distances. The logs hauled were cut in 12, 14, and 16 foot lengths, but mostly 16. The timber was chiefly western yellow pine, together with a smaller amount of white fir and white pine. The logs were skidded by horses from 1-8 to 3-8 of a mile and loaded on the truck from the skidways. Loading was by cross haul, the truck driver and tail-down man doing the loading. During the first nine days of this study, corner bind chains were used to hold the load to the trucks. Then automatic drop stakes were put on the bunks reducing the net time of trips about 1.1 per cent as well as making it much easier to load. Wrapper chains on the loads were not used.

Hauling was done from three principal skidways, over a country road and the logs dumped directly into the river. Some little time was lost at the river due to the landing becoming jammed but no allowance has been made for that because circumstances made it impossible to go with the truck and record the time spent at the landing. For convenience, the skidways will be called Numbers 1, 2, and 3, and represent a haul of 440, 560 and 1160 yards respectively. All distances were paced. Skidways 1 and 2 were each about 80 the main road and at a considerabl above it. It was necessary to turn around on the main road and then skidways. In wet weather, the team was required to help the truc the main road to the skidways. road was in good condition with grades. However, it was narrow many sharp turns, which caused c delay due to slowing down and som ing to stop in order to pass cars g opposite direction. The last 100 ya the landing was over a rough cord had to be pulled in low gear.

The weather for the most part w clear. In all, there were about 6 the roads were slick or soft enoug fere with the hauling. On these da loads were hauled and tire chain Three skidding teams were used to skidways, but there was a great d time due to the fact that the skid was not sufficient to get the logs to ways as fast as the truck hauled t There was on the average 8.16 mi per trip. This time of waiting for longest on the shorter hauls. The t haul between 15000 and 16000 ft. p 8 hrs., and 4 teams should have be bring out this amount without del

The operation of the truck was t July 19 until September 10, during w 379 trips were made, hauling a total ft. log scale. The actual time spen ing was 209 3-4 hours, or an output per hour.

Table I is a summary of the results obtained. The time of hauling was taken as the time consumed in hauling the load to the landing, unloading and returning to the skidway. The time of loading was measured from the time the motor stopped until it was again started, but time lost waiting for logs was not included in these figures.

Table I.

Skidway No.	1	2	3	Total all Skidways
Distance hauled (yards)	440	560	1,160	
No. loads	42	190	147	379
No. logs	287	1,034	1,009	2,330
Total scale	47,660	195,110	157,600	400,370
Av. logs per M........	6.02	5.30	6.40	5.82
Av. logs per load.....	6.83	5.44	6.86	6.15
Av. scale per load	1,135	1,051	1,073	1,056
Av. scale per hour....	2,191	2,098	1,658	1,908
Av. time of hauling per M.	27.38	28.59	36.18	31.43
Av. net time of trip..	31.07	29.36	38.78	33.20
Av net time of loading	15.62	11.85	14.12	13.15
Av. net time of hauling	15.45	17.51	24.66	20.05
Av. lost time per load..	14.26	7.93	6.73	8.17

Table II shows the output per effective hour and the time required to haul one thousand feet board measure for different distances.

Table II.

Distance Hauled in yards	Output per hour B. M.	Time of hauling per M. ft. B. M. in minutes
300	2320	26.0
400	2230	27.0
500	2140	28.0
600	2060	29.1
700	1980	30.2
800	1900	31.4
900	1830	32.6
1000	1760	33.9
1100	1690	35.3
1200	1630	36.8
1300	1570	38.3
1400	1510	39.8
1500	1460	41.4
1600	1400	43.0
1700	1350	44.7

For Table II, the output per hour was plotted on cross-section paper as ordinates, with distance hauled as abscissae and a smooth curve drawn thru the three points furnished by the data from each skidway. Values for distances from 300 up to 1700 yards were read from this curve. As a check, the time of hauling per M feet was plotted upon distance, as before. These values were then divided into 60 to give output per hour. It was found that these computed values correspond very closely to those read from the first curve.

PERSONALS

H. W. Staples, '20, and C. R. Patrie, '21, have been reengaged for the summer for timber sale administration on the Coeur d'Alene National Forest. J. P. Drissen, '21, will accept a temporary appointment with the U. S. Forest Service for either brush disposal work on the Coeur d'Alene or fire protection on the Pend d'Oreille. Staples, Patrie and Drissen all passed the Forest Assistant examination in March with good grades.

Frank A. Brown, '22, will have charge of an extensive survey to secure working plan data on the Selway National Forest this summer. The country will be covered by a four-man crew, working individually and running strips at one-half mile intervals with drainage for control. Russel Parsons, '22, will be a member of Brown's party for this survey.

Floyd Cossitt, ex '21, gave up his scaling for the Potlatch Lumber Company in order to go back to the Selway National Forest where he will act as assistant ranger this summer. He will return to school again in the fall.

A. S. Daniels, '23, will also return to the Selway for the summer to handle the commissary at Pete King Station.

W. Byron Miller, '22, took the examination for Grazing Assistant in April and has been notified that he passed with a good margin of safety. Pending an appointment, he will be employed on grazing reconnaissance in Utah for the summer.

James W. Farrell will be a member of a party to lay out a series of sample plots on the Cache National Forest.

The Clearwater National Forest will have a large quota of Idaho men this summer. Edward Nero, '22, has accepted an appointment as Forest Ranger for the Mussellshell District and plans to hold this position for next year and then return to complete his course in the Forest School the following year.

Harold Barto, '23, will be Assistant Ranger, Leslie Eddie, '24, smokechaser and J. W. Stoneman, '23, and M. J. Markham, '24, lookouts on the Mussellshell District this summer. Leonard King and Robert Johanson of the Ranger Course will also be engaged in fire protection on the Clearwater. Willard Storms, '23, will complete our representation on the Clearwater by returning to the commissary on the Chamberlin Meadows District.

J. W. Rodner, '23, will again occupy an important lookout station for the Coeur d'Alene Timber Protective Association this season.

Fred Chamberlin, '23, will be reengaged for work with the Blackwell Lumber Company of Coeur d'Alene.

Ivan Melick, '22, will work at home on his ranch during the summer.

Arthur Yaggy, '23, has accepted an appointment for protection work on the St. Joe National Forest.

Herman Baumann, '23, will spend the summer at his home in Wisconsin.

Harry Fuller, '24, goes to the Challis National Forest in District 4 for the summer.

Raymond Peterson, '24, has taken position on the Falls District of the

Earl Bradfield, '24, has a position keeper for the Boise Payette Lumt Blackfoot, Idaho.

Elva A. Snow, '24, will be engage ing reconnaissaince on the Beave tional Forest in Montana.

Edwin Chamberlain, '24, has an ap for duty on the St. Joe National the summer.

Robert Kelly and Verne Hallcra year's Ranger Course are both on th National Forest at present and a the work much to their liking.

Ralph Rudesill, (R. C.) has go Payette National Forest.

R. L. Hand, (R. C.) has been work Forest School arboretum all spring take a position on the St. Joe Natio for the summer.

L. L. Darrah dropped from th Course to take up a farm near Mos this spring.

Howard Humm, (R. C.) has gon Mexico where his folks own propert ing to get a position with the Fore in District 3.

Wesley Melzian (R. C.) was marri cow soon after the first of the yea been teaching school in Montana si

Joseph Maruska dropped from th Course early in the term to accor work on his homestead necessary t claim.

Practically all of the men taking tional Course under the Federal Rehabilitation have been placed fo training with the U. S. Forest Servi

Laurence Autrey, Howard Hig George W. Clark will go to the Umat in eastern Oregon for work in fire

Assistant ranger positions on th for the coming season will be filled C. Perkins at the High Valley Stati Perkins at the South Fork of Salm C. E. McGrath at the Garden Vall and V. V. Cherry at the Crawfor Glenn Perkns' work will be genera tration. Parley Perkins will spen his time on grazing and fire McGrath in addition to the general the ranger will help harvest the h his station and Cherry will be use missary assistant.

Charles M. Adkins has been assigned to the Coeur d'Alene National Forest.

Norman E. Taylor will be stationed on the Middle Fork District of the Selway National Forest. The Clearwater will take France Reuterskiold, Byrl Wheeler, Howard Holler and Joseph Hamil for training in fire protection and forest improvements this summer.

Lawrence Luby has been assigned to the Caribou National Forest at Montpelier, Idaho.

Lester Eby and Frank Folsom will go to the Gallatin National Forest at Bozeman, Montana.

Frank Moses will be obliged to drop forest ranger work, because of his health, but will be put under training for clerical work in connection with the National Forests.

Recent visitors at the School of Forestry include: Frank Jefferson, Supervisor, and Andrew J. Devan, Fire Assistant, Selway National Forest and I. W. Cook, Logging Engineer for the Winton Lumber Co. of Coeur d'Alene, Idaho.

XI SIGMA PI

Three students and two members of the faculty of the School of Forestry of the University of Idaho were elected to membership in the National forestry honorary fraternity, Xi Sigma Pi, during the school year which has just been completed. The following were elected to Epsilon chapter at this university: Oscar Charles Munson, '21, William Byron Miller, '22, James W. Farrell, '22, John B. Taylor and Prof. C. Edward Behre.

Xi Sigma Pi, the oldest of honorary forestry fraternities, was founded at the University of Washington in November, 1908. The object of the fraternity is to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry and to promote fraternal relations among earnest workers engaged in forest activities. The results obtained have been most satisfactory and the future of the fraternity is assured. Election to this fraternity is based on scholarship, personality, and activity in the various enterprises of the university and School of Forestry.

THE TOXICITY OF ZINC CHLORIDE TO WOOD DESTROYING FUNGI [1]

C. R. PATRIE, '21

With the impending scarcity of wood and the high prices already prevailing, the preservation of wood is becoming more and more important. With the growth of this industry the question of cheap preservative, easily handled and readily available becomes an important one. Coal-tar creasote at present is the most extensively used preservative but its cost has increased somewhat since the war and the other preservatives are coming into greater use. The water soluble salts of the heavy metals are toxic to the growth of wood destroying fungi and relatively cheap and hence of great importance in preservation. They have however certain disadvantages as for example their corrosive action on iron and others. For this reason they will perhaps never entirely replace coal tar creosotes as a wood preservative.

Zinc chloride is the most extensively used inorganic wood preservative in the country. It was first extensively employed in England by Wm. Burnett in 1838 and is now used in most of the European countries. Zinc chloride is quite toxic to wood destroying fungi having about the same degree of toxity as coal-tar creosote. Its solubility in water makes it inadvisable to use under certain conditions but under other conditions it has decided advantages over all other preservatives. Zinc chloride corrodes iron in concentrated solutions but the concentrations used in the treatment of wood are dilute enough to make corrosive action negligible.

In considering any substance as a wood preservative the concentration necessary to inhibit the growth of wood destroying fungi is an important point.

1. Thanks are due Dr. Henry Schmitz not only for suggesting the problem but for his kind assistance throughout.

The toxic point of zinc chloride has been previously determined by Humphry and Fleming [2], Rumbold [3], and others [4], [5]. All of these workers however employed the Petri dish method using nutrient agar or gelatin media. In a recent unpublished paper by Schmits and Zellar [6] the errors of the Petri dish method to determine the toxity of certain chemicals to wood destroying fungi have been pointed out. The action of electrolytes on agar and gelatin is of course well known and therefore results obtained by the Petri dish method need not necessarily hold when Zinc chloride is injected into the wood. For this reason finely ground wood was employed as the culture medium. Results obtained under these conditions have a direct application to actual practice.

METHODS

In the experimental work here reported Douglas fir, (**Pseudotsuga taxifolia**), white fir, (**Abies grandis**), and chestnut, (**Castanea dentata**) were used as the culture medium. They were chosen as typical of the more extensively used conifers and hardwoods used in this country. Since these woods are widely used in situations where preservative treatment is a decided advantage, the results obtained may have a direct application.

Sawdust of the above mentioned species was carefully ground and then sifted thru a sieve having a two mm. mesh. Thus a sawdust of standard size was secured. The sawdust was then allowed to dry at room temperature for several days.

Stock solutions were made up in the following manner: Chemically pure zinc chloride was placed in weighing flasks of known weight and dried in an electric oven at 120° C. for
twenty-four hours weighed. A
amount of water was added to n
per cent solution of $Zn\ Cl_2$. It was
ever that a precipitate, presumabl
bonate, remained in the solution.
filtered, dried and weighed and e
chloride added to the solution to
per cent desired. It was found t
grams of wood would just absorb
solution without any free water
Consequently as fifty cc. of fiv
solution would contain two a
grams of zinc chloride, the fifty cc.
when added to twenty grams of v
produce a concentration of 3.57 per
lated on the weight of sawdust plus
Using the 3.57 per cent solution as
other concentrations desired were r
usual manner, i.e. by dilution and o
basis as above.

An objection might be made th
centrations as determined are ba
wet weight of wood rather th
weight of wood and that the dry
wood should be the real basis of
concentrations. To meet this obj
two concentrations are given in th
table: However, under natural
wood is often used in places su
would absorb considerable moistu
concentration would have to be bas

The sawdust in 20.00 gram lots
ously stirred while the solutions
added so that an even mixture w
Approximately 5 grams of sawdus
transferred to each of two 3 ounce
the flasks plugged with cotton.
were then sterilized for twenty
fifteen pounds pressure and inoc
small squares of Lenzites saepi
usual manner. The bottles were in
twelve days at room temperateure.

Lenzites saepiaria is a comn
causing the decay of structural tim
a wide spread and cosmopolitan
general growth was least rapid or
fir wood and greatest on the ches
After incubation the cultures wer
examined with the hand lens to
whether or not the mycelium has
the wood and if so to what extent

In the following table the gro
respective concentrations for the t
and the toxic point for each wooc

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TABLE I.

SHOWING THE EFFECT OF VARIOUS CONCENTRATIONS OF ZINC CHLORIDE ADDED TO WHITE FIR, DOUGLAS FIR, AND CHESTNUT SAWDUST ON THE GROWTH OF LENZITES SAEPIARIA.

Concentration of Zn Cl		Growth of Lenzites Saepiaria		
Based on Wet Weights of Wood	Based on Dry Weights of Wood	Chestnut	Douglas Fir	White Fir
.055	.195	very good		
.055	.195	very good		
.069	.244	very good	slow	good
.069	.244	very good	slow	good
.083	.293	luxuriant	good	
.083	.293	luxuriant	good	
.097	.342	very good	doubtful	good
.097	.342	good	good	good
.111	.39	good	good	good
.111	.39	good	slow	good
.139	.487	good	good	good
.139	.487	good	good	good
.166	.585	good	good	slow
.166	.585	good	slight	slow
.195	.683	slow	slight	moderate
.195	.683	slow	slight	no growth
.223	.78	slow	no growth	good
.223	.78	good	no growth	very slight
.278	.98	slow	slight growth	no growth
.278	.98	very slow	no growth	no growth
.333	1.17	no growth	no growth	no growth
.333	1.17	no growth	no growth	no growth
.389	1.36	no growth	no growth	no growth
.389	1.36	no growth	no growth	no growth
.445	1.56	no growth	no growth	no growth
.445	1.56	no growth	no growth	no growth
.556	1.95	no growth	no growth	uncertain
.556	1.95	no growth	no growth	uncertain
.667	2.34	no growth	no growth	no growth
.667	2.34	no growth	no growth	no growth
.778	2.73	no growth	no growth	no growth
.778	2.73	no growth	no growth	no growth
.89	3.125	no growth	no growth	no growth
.89	3.125	no growth	no growth	
1.11	3.91	no growth	no growth	no growth
1.11	3.91	no growth		no growth
1.33	4.69	no growth		
1.33	4.69	no growth		
1.53	5.47	no growth		
1.53	5.47	no growth		
1.78	6.25	no growth		
1.78	6.25	no growth		

CONCLUSION

The results here reported tend to indicate that the species of wood has little effect on the toxicity of zinc chloride to wood destroying fungi. Zinc chloride when impregnated in Douglas fir, white fir, and chestnut wood is toxic to the growth of Lenzites saepiaria at the concentration of .333 per cent based on the wet weight of wood. This result differs considerably from the previous results of others. Humphrey and Fleming employing the Petri dish method find that the toxic point of zinc chloride to wood destroying fungi, particularly Lenzites saepiaria, lines between 1 per cent and 2 per cent. This difference in result is probably due to the effect of the electrolyte zinc chloride on the collodial agar or gelatine.

Schmitz and Zeller find a similar difference in their results. They find the toxic concentration of creosote when impregnated in wood to wood destroying fungi is not lower than 1 per cent and is usually higher.

From the results here reported it is evident, that when the concentration of zinc chloride in wood treated with this chemical is reduced thru leaching below .333 per cent of the wet weight of wood, the wood will be left susceptible to decay.

STEM FORM STUDIES OF WESTERN YELLOW PIN
(Preliminary Report)

By J. P. DRISSEN, '21

The object of this work is to test the application of Jonson's form quotient as an expression of stem form in stands of Western Yellow Pine in North Idaho.

To express the variation in stem form or taper Jonson uses the absolute form quotient formula, $q=\frac{d}{D}$ in which d is the diameter at ½ height above breast height. The advantage of this method of expressing the form is that the classification is made independent of height, the two form determining elements having the same relation to each other. It has been definitely shown by Jonson, Schiffel and others that trees of the same form quotient taper according to a fixed law. Jonson has also shown that the taper of trees of the same form class is independent of height provided the measurements are made at proportional places along the stem. He says "The percentic taper is the same in all normal spruce of the same form class, not-withstanding differences in height and diameter. A large tree is developed exactly as a small tree, provided both have the same absolute form quotient." Jonson has also shown this to be true for Scotch Pine, and L. Mattson-Marn has found scarcely any difference between his figures for larch and those of Jonson for spruce and pine. Jonson's volume tables for spruce and pine are also applicable to larch.

If it can be shown that the absolute form quotient is as reliable as an expression of form in this continent as it is in the Scandinavian countries much of the time, money and energy now spent in the construction of volume tables would be saved. Claughton-Wallin has found that both Eastern white and red pines in Ontario follow very closely the taper for Scotch Pine computed from the algebraic formula used in Europe and McVicker in British Columbia has shown that Douglas fir also conforms closely to the European taper series in the portion of the stem above the root swelling. The stump flare however in the western trees was found to affect the stem curve up to 20 per cent or more of the total length and so made results based on actual d. b. h. very erratic.

Data Used

Taper series were analyized for by dividing the d. b. h. into the diameters at each tenth of the st breast height. These measurements tained in two ways. First, by actua uring the felled trees at the propor tervals and second, by plotting taper ments made at log lengths on cro paper and reading off the diameters sired intervals. Eleven Douglas fir Western yellow pine were measure Huesby homestead, twelve miles east son, Idaho. One of the yellow pines carded due to an abnormal swellin trunk at one of the measurements trees were in a fairly dense, mixed s ranged from ten to twenty-seven i diameter.

Twenty trees were measured near mill 8 miles north of Moscow, Idahc trees were in a dense second grow in site quality I, and averaged 7.2 inc h. 38. feet in height and 36 years ol

Taper curves were plotted for twe western yellow pine and the d. b. h. diameters at each tenth of the heigl d. b. h. read off. The measurements u made at log lengths, by the U. S. Fores in connection with logging operations Kootenai National Forest. These tree from 12 to 25 inches d. b. h.

Computations

The form quotient $\frac{d5}{D}$ was found i tree and the trees grouped by .05 clas average tree for each locality was det for each form class by adding the diam corresponding sections. From these trees percentic taper series were comp each of the three sets of figures. This v done with the average data from all tl calities. The taper series for the three ties and the series for the average three were plotted on cross-section pa the points connected up by curves in o study their eccentricities and the relati tween them.

Observations

A possible source of error in basi

taper series on an average tree found from averaging diameters was noted. Instead of being based solely on the number of trees, the average is affected materially by the size of the trees. A tree 12 inches in diameter has just as much weight as two 6 inch trees. A better average could be obtained by averaging the percentic tapers of each tree. This was the method apparently used by Jonson in Sweden and Claughton-Wallin in Ontario but McVicker's figures for Douglas fir were averaged in the manner described in this article.

In the case of the large trees from the Harrison and Kootenai localities the plotted curves show that the taper series are much distorted, due to the d. b. h being affected by the stump flare. The average for form class .60 on the Kootenai was plotted on cross-section paper and a curve representing the taper of the tree drawn thru the known points. This showed that at 20 per cent above d. b. h. the curve began to swing outwards. The curve was prolonged downward from the 20 per cent point according to its natural trend and a "normal" breast height diameter was obtained. This changed the average diameter from 19.0 inches to 16.4 inches and raised the form quotient from .603 to .701. The new taper series obtained from this "normal curve" corresponds very closely to Jonson's computed series for the Norway spruce.

The same was done for form class .70 from the Harrison plot with like results. The d. b. h. was reduced from 14.9 inches to 13.9 inches and the form quotient was raised from .704 to .755. The new percentic taper series corresponded verly closely to the average for white and red pine in Ontario and quite closely to Jonson's computed series for Scotch pine.

This is in very close harmony with the results from measurements on Douglas fir in British Columbia.

The averaged series in the .70, .75, and .80 classes nearly all fall short of the computed series in the top measurements. This fact has also been noted by Prof. Jonson in his work. Claughton-Wallin and McVicker also observed this in their work in Ontario and British Columbia.

Due to the abnormal d. b. h of the large trees from Harrison and the Kootenai it was deemed advisable to make a detailed comparison only for the trees from the younger second growth stand near Moscow. The percentic series for each form class were plotted on cross section paper and the points used as a basis for a set of harmonized curves.

The curves for the even form classes were drawn in by interpolation. These values were then compared with Jonson's tables for Norway spruce and Scotch pine and also with Claughton-Wallin and McVicker's table for red and white pines in Ontario.

The first eight trees were from a section of the stand which was not so dense so that from which the last twelve were measured. The average form quotient of the eight trees was .604 while that of the twelve trees was .669, a difference of .065.

Following is a detailed comparison with Jonson's computed tables for Spruce and Scotch pine and Claughton-Wallin and McVicker's table for red and white pines. The absolute form factors are computed by the formula.

$$F=\frac{\frac{1}{2}D^2+d_1^2+d_2^2+d_3^2+\ .\ .\ .\ .\ +d_9^2}{10\ D^2}$$

where $D=100$; $d_1=90$; $d_2=80$, etc.

FORM CLASS 55 (2 Trees—Average d. b. h 9.4 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	9	Absolute Form Factor
Western Yellow Pine	100	91.6	83.4	74.5	65.2	55.0	45.0	34.3	23.6	12.6	.371
Norway Spruce	100	91.6	82.9	74.0	64.7	55.0	44.9	34.4	23.5	12.0	.368
Variation per cent			+.5	+.5	+.5		+.1	-.1	+.1	+.6	+.003

FORM CLASS 60 (5 Trees—Average d. b. h 8.5 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	9	Absolute Form Factor
Western Yellow Pine	100	93.0	85.6	77.8	69.8	60.0	50.0	38.5	27.0	15.2	.404
Norway Spruce	100	93.0	85.5	77.6	69.1	60.0	50.1	39.4	27.7	14.6	.404
Variation per cent			+.1	+.2	+.7		-.1	-.9	-.7	+.6	
Scotch Pine	100	93.1	85.7	77.8	69.3	60.0	49.9	38.7	26.0	12.0	.403
Variation per cent		-.1	+.1		+.5		+.1	-.2	+1.0	+3.2	+.001
White and Red Pines	100	93.2	85.8	77.9	69.4	60.0	50.0	38.4	25.9	12.9	.403
Variation per cent		-.2	-.2	-.1	+.4			+.1	+1.1	+2.3	+.001

FORM CLASS 65 (8 Trees—Average d. b. h. 7.5 Inches)

Section	B. H.	1	2	3	4	5	6	7	8	9	Absolute Form Factor
Western Yellow Pine	100	94.2	87.6	80.5	73.2	65.0	55.3	44.0	31.6	18.5	.439
Norway Spruce	100	94.2	87.8	80.9	73.4	65.0	55.6	45.0	32.7	18.0	.443
Variation per cent			-.2	-.4	-.2		-.3	-1.0	-1.1	+.5	-.004
Scotch Pine	100	94.3	88.0	81.1	73.5	65.0	55.4	44.3	31.1	15.0	.441
Variation per cent		-.1	-.4	-.6	-.3		-.1	-.3	+.5	+ 3.5	-.002
White and Red Pines	100	94.3	88.0	81.0	73.6	65.0	55.4	43.8	30.6	15.6	.440
Variation per cent		-.1	-.4	-.5	-.4		-.1	+.2	+1.0	+2.9	-.001

FORM CLASS 70 (4 Trees—Average d. b. h. 4.7 Inches)

Absolut

Section	B. H.	1	2	3	4	5	6	7	8	9
Western Yellow Pine	100	95.5	90.1	84.4	77.4	70.0	60.5	49.0	36.5	22.4
Norway Spruce	100	95.2	89.9	84.0	77.5	70.0	61.4	51.3	38.8	22.7
Variation per cent		+.5	+.2	+.4	-.1		-.9	-2.3	-2.3	-.3
Scotch Pine	100	95.3	90.0	84.1	77.5	70.0	61.1	50.6	37.2	19.4
Variation per cent		+.2	+.1	+.3	-.1		-.6	-1.6	-.7	+3.0
White and Red Pines	100	95.3	90.2	84.3	77.8	70.0	60.7	49.5	35.8	19.2
Variation per cent		+.2	-.1	+.1	-.4		.2	.5	+.7	+3.2

FORM CLASS 75 (Interpolated Graphically—No Trees)

Absolut

Section	B. H.	1	2	3	4	5	6	7	8	9
Western Yellow Pine	100	96.6	92.5	87.5	81.9	75.0	65.4	53.7	40.0	25.5
Norway Spruce	100	96.1	91.7	86.9	81.4	75.0	67.5	58.2	46.3	29.3
Variation per cent		+.5	+.8	+6	+.5		-2.1	-4.5	-6.3	-3.8
Scotch Pine	100	96.2	91.9	87.0	81.5	75.0	67.3	57.6	44.8	25.6
Variation per cent		+.4	+.6	+.5	+.4		-1.9	-3.9	-4.8	-.1
White and Red Pines	100	96.2	91.8	87.0	81.8	75.0	66.7	56.0	41.5	23.2
Variation per cent		+.4	+.7	+.5	+.1		-1.3	-2.3	-1.5	+2.3

FORM CLASS 80 (1 Tree—d. b. h. 4.0 Inches)

Absolute

Section	B. H.	1	2	3	4	5	6	7	8	9
Western Yellow Pine	100	97.4	94.3	90.2	85.6	80.0	70.5	59.0	45.0	29.1
Norway Spruce	100	96.9	93.5	89.6	85.1	80.0	73.7	65.8	55.2	38.7
Variation per cent		+.5	+.8	+.6	+.5		-3.2	-6.8	-10.2	-9.6
Scotch Pine	100	97.0	93.6	89.7	85.2	80.0	73.6	65.4	53.9	34.7
Variation per cent		+.4	+.7	+.5	+.4		-3.1	-6.4	-8.9	-5.6
White and Red Pines	100	97.0	93.7	89.7	85.4	80.0	73.0	62.7	48.5	28.7
Variation per cent		+.4	+.6	+.5	+.2		-2.5	-3.7	-3.5	+.4

Conclusions

1. Jonson's absolute form quotient is a fair index of stem form as applied to Western Yellow Pine trees in which the butt flare does not extend above breast height.

2. That in the larger trees the butt flare extends up into the first measurements, thus distorting the taper series. The effect is to lower the form class.

3. That trees in denser stands are of a higher form class than those standing more in the open.

4. Within an even aged stand la have a lower form class than the trees.

5. Western Yellow Pine confor nearly in taper inside bark to Easte and Red Pines than to Norway S Scotch Pine, particularly in the hig classes.

6. That Jonson's absolute form fa volume tables can be used in estimat aged stands of Western Yellow Pine d. b. h. readings are above the stump

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1920-21. The information after each name is in the following order: 1, name; 2, home address; 3, fraternity; 4, honorary fraternity; 5, scholastic achievements and athletics.

Graduate.

Staples, Howard William, B. S. (For.) 1921; 109 S. Monroe Street Moscow, Idaho; Phi Gamma Delta; Xi Sigma Pi; Alpha Zeta; President Associated Foresters, Vice President A. S. U. I. and Business Manager "Idaho Forester," 1920.

1921.

Drissen, John Philip, Harrison, Idaho; Xi Sigma Pi; President Associated Foreters, 1920-21; Associate Editor "Idaho Forest and 1921.

Munson, Oscar Charles, Moscow, Idaho Nu; Xi Sigma Pi.

Patrie, Carthon Roy, 7 Plymouth Stre mouth, Wisconsin; Xi Sigma Pi; "Idaho Forester," 1921.

1922.

Brown, Frank A., 308 State Street, Bo ho; Kappa Sigma; Sec.-Treas. As Foresters 1918-19; Associate Editor Forester", 1920 and 1921; Vice Presi Club, 1920-1921; Football "I", 1919 a

Cossitt, Floyd Morgan, 308 E. 10th Weiser, Idaho; Elwetas; Xi Sigma

Farrell, James W., New Meadows, Ida Gamma Delta; Xi Sigma Pi, Alpha Sec.-Treas. Associated Foresters,

Vice-President Associated Foresters, 1920-21, Editor "Idaho Forester", 1920, Ass't Bus. Mgr., "Gem of the Mountains", 1922.
Melick, Harvey Ivan, Nampa, Idaho.
Miller, William Byron, Stevenson Washington; Xi Sigma Pi; Alpha Zeta.
Nero, Edward T., Moscow, Idaho; Vice President Associated Foreters, 1919-20; Sec.-Treas. Associated Foresters 1921-21; Associate Editor "Idaho Forester", 1921.

1923.

Baumann, Herman, 1314 Louis Avenue, Milwaukee, Wisconsin.
Barto, Harold, Spokane, Washington; Kappa Sigma; Football squad, 1920.
Chamberlin, Fred, Ceur d'Alene, Idaho; Sigma Nu.
Daniels, Albert Stanley, 601 S. Henry St., Bay City, Michigan; Phi Gamma Delta; President Associated Foreters, 1919-20.
Nicol, Henry Q., Reubens, Idaho.
Parsons, Russell M., Moscow, Idaho; Beta Theta Pi.
Rodner, Jack W., Moscow, Idaho; Sigma Alpha Epsilon.
Ryan, Cecil, Moscow, Idaho; Kappa Sigma.
Stoneman, John Warren; Sigma Alpha Epsilon; Track "I" 1921.
Storms, Williard Sidney, Rupert, Idaho; Kappa Sigma; Associate Editor "Idaho Forester" 1920.
Yaggy, Arthur, Nampa, Idaho.

1924.

Bradfield, Earl Francis, 303 S. Second St., Pocatello, Idaho.
Chamberlain, Edwin William, Moscow, Idaho.
Eddy, Leslie Eugene, Dietrich Idaho.
Fuller Harry E., Emmett, Idaho.
Griep, Kenneth, Fruitland, Idaho.
Madlinger, George Joseph, Poughkeepsie, New York.
Markham, Murle Joseph, Grangeville, Idaho; Sigma Alpha Epsilon.
Peterson, Raymond, Moravia, Idaho.
Snow, Elva A., Boise, Idaho; Kappa Sigma.
Throckmorton, Michael Reed, Rupert, Idaho.

Ranger Course.

Darrah, Lionel Leonard, Hillside Ave., Catham, N. J.
Flygg, Carl Jacob, Shelley, Idaho.
Hallcraft, Vernon R., Nampa, Idaho.
Hand, Ralph L., Ashville, New York.
Humm, Howard, Berkeley, California.
Johanson, Robert, Orofino, Idaho.
Kelley, Robert, Bradford, Pa.
King, Leonard Austin, Orofino, Idaho.
Maruska, Joseph, Sandpoint, Idaho.
Melzian, Wesley, Sleepy Eye, Montana.
Roeder, Charles, Streator, Illinois.
Rudcsill, Ralph, Bradford, Pa.
Sievers, Lawrence, Milwaukee, Wisconsin.
Welker, Leonard, New Holstein, Wisconsin.

Federal Board Vocational Course.

Adkins, Chas. M., Moscow, Idaho.
Autrey, Lawrence, Hauser Terry, Washington.
Ballou, Walter Grant, Portland, Oregon.
Berry, Burtt Lawrence, Mountain Home, Ida
Cherry, Vane Gilbert, Whiteflat, Texas.
Clark, George Wm., Toushet, Washington.
Eby, Lester W., Walla Walla, Washington.
Folsom, Frank B., Elizabethton, Tenn.
Hamil, Joseph H., Bremerton, Washington.
Higgins, Howard Watkins, Fredricktown, Ohio.
Holler, Howard M.
Jones, Lloyd A., Monida, Montana.
Leonard, Louis P., Wisiona, Idaho.
Luby, Lawrence Louis, Idaho Falls, Idaho.
McGrath, Charles Earl, Middleton, Idaho.
Mackey, J. B., Salmon, Idaho.
Moses, Frank, Iron River, Idaho.
Perkins, Glen C., Pocatello, Idaho.
Perkins, Parley P., Pocatello, Idaho.
Reuterskiold, France W., Fort Atkinson, Wis.
Snelson, Leonard F., Filer, Idaho.
Stroud, W. T., Salmon, Idaho.
Taylor, Norman Ellisworth, Oroville, Wash.
Wheeler, Byrl, Weiser, Idaho.

ALUMNI AND FORMER STUDENTS

Alumni and Former Students.

The following list of alumni and former students is not complete. Additions and corrections of addresses given will be appreciated as we desire to keep a complete and accurate list of all former students.

Allen, Thomas William, ex '22, Caldwell, Idaho.
Anderson, Mark, ex-'15, Provo, Utah.
Ashton, Allen White, ex-'22, Boise, Idaho.
Barger, Harold B., ex-'17, Browning, Montana.
Bedwell, Jessie Leonard, '20, Council, Idaho.
Berry, Waldo Lee, R. C. '15-'16, Post Falls, Ida.
Brockman, Cecil C., ex-'23, Bickelton, Wash.
Buckingham, William E. M., ex-'22, Gifford, Ida. Ranger, U. S. F. S., Orofino, Idaho.
Burns, Robert Owen, ex-'15, Payette, Idaho.

Cable, Guy Burr, ex-'22, Roberts, I
Chamberlin, Gail B., ex-'22, Coe
Idaho.

Carlson, Oscar, '15, B. S. (For.), dec
Cook, Jacob Miller, ex-'20, Oberlin,
Cooper, Alfred, ex-'20, Los Angeles,

Core, Glen R., ex-'23, Burley, Idaho
Cowan, Talmage Dewitt, R. C., '15-'
thony, Idaho.

Cross, Sidney W., ex-'23, Sacramen
Cunningham, Russell H., '17 B. S. (I
F. S., Grangeville, Idaho.

Darnall, Glenn McClellan, ex-'16, Pa
Dart, William Ellisworth, ex-'20, Mc
Daugherty, Chas. Ira, ex-'22, Challis,
Davis, Roscoe Richard, ex-'21, Star,
Decker, Arlie Delos, '13 B. S. (Fo
Yale University '17. (Land Agent
Lumber Co., Potlatch, Idaho.)

Denning, Steward K., ex-'13.
Dipple, Ralph, ex-'14. (Dentist, S
Oregon.)

Dodge, Keith Allen, R. C. '15-'16, Ch
Duncan, Robert, R. C., '16-'17, Josepl
Edwards, Kenneth Duncan, ex-'22, Na
Eldridge, Ferris Edwin, ex-'18, Almc
M.

Elhart, Carlton D., ex-'22, Caldwell,
Evans, Philip Smith, ex-'20, Preston,
Faucett, Vernon, ex-'14.

Favre, Clarence Eugene, B. S., (F
M. S. (For.), '15. (District Forest
Elko, Nevada.)

Fenn, Lloyd Alfred, '11 B. S. (For.),
Idaho; Attorney at Law; Manager
Mountaineer"; Member of State Le
H. R. 1921.
Fields, Chas. Carlos, ex-'14.

Gerrard, Paul Henry, ex-'21, Vancouve
(Ranger, U. S. F. S. Orofino, Idaho

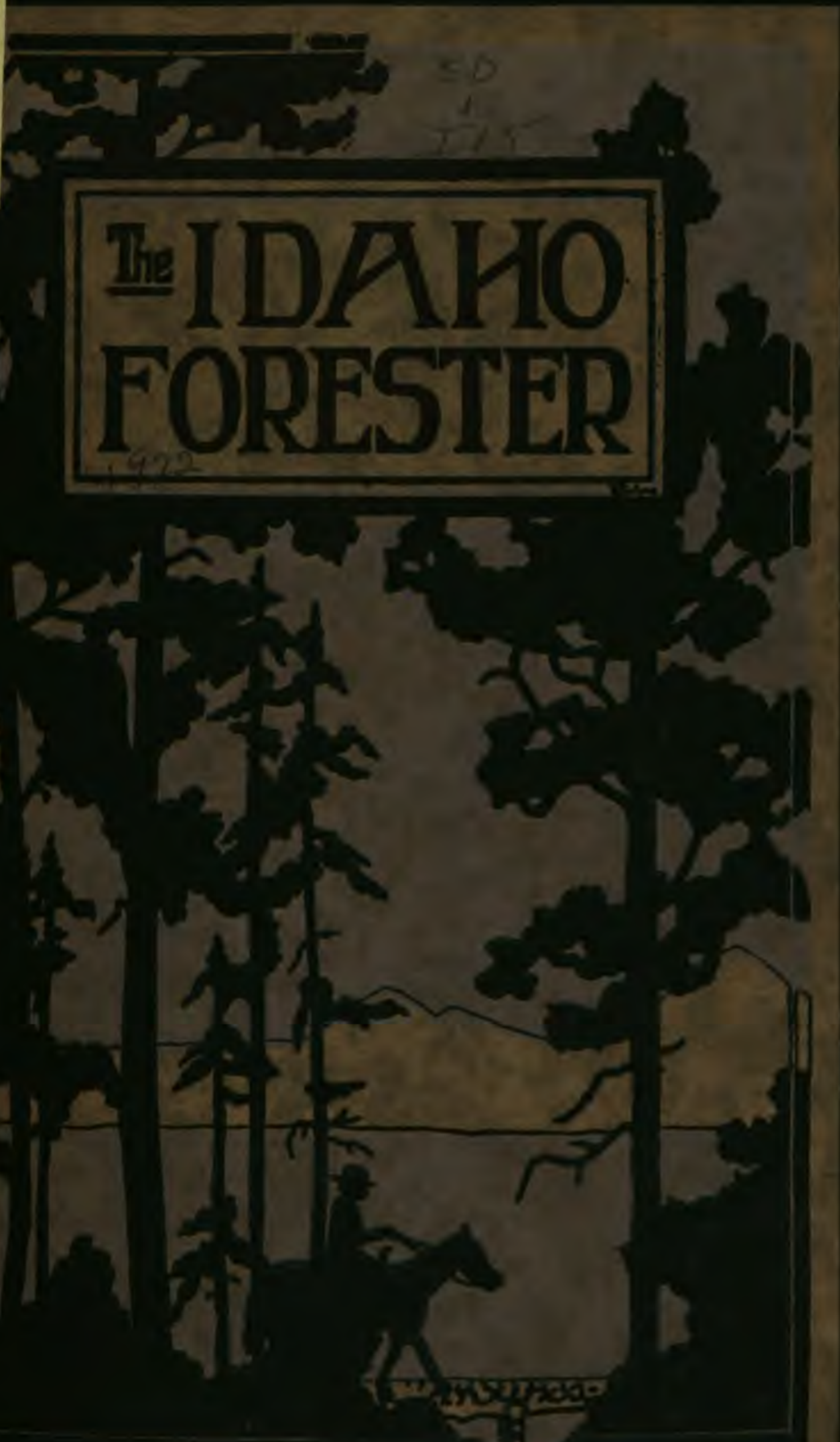
Gildea, Howard Cecil, ex-'14, McMinnv
(Lawyer.)

Gavin, C. H., ex-'23, Heise, Idaho.
Gilman, John Elmo, ex-'19, Hailey, Ida
Hamilton, William Howard, ex-'22
Paulo, Cal.

Hamilton, Richard Alvord, ex-'19, Orof
Hammond, George M., ex-'20, Pocatello
(Retail Lumber Business, Pocatello.)

Hanzen, Maurice Henry, ex-'20, Moscow
Hart, Irving Warren, ex-'22, Boise, Ida
Haynes, Ralph M., R. C. '16-'17, Emme

Headdick, Ralph Alonzo, R. C. '16-'17, Moscow, Idaho.
Heard, Herman Claude, ex-'13.
Helfrich, Will Edward, ex-'15.
Herman, Chas. Henry, '13, B. S. (For.), Enterprise, Oregon. (Manager East Oregon Lbr. Co. Enterprise, Oregon.)
Hillman, Wm. P., ex-'13.
Hockett, Robert Vestal, ex-'13.
Joke, J. A., R. C. '15-'16, Moscow, Idaho.
Haladay, Howard Wesley, ex-'16, Deceased.
Humphrey, Clyde Pearson, ex-'17, Coeur d'Alene, Idaho. (State Highway Department, Twin Falls, Idaho.)
Huestis, Clarence, R. C. '16-'17, Council, Idaho.
Hyde, Clarence Otis, ex-'19, Oreana, Idaho. (Bank clerk, Spokane, Washington.)
Jackson, Tom, '19 B. S. (For.), Clarkia, Idaho. (Logging Engineer, Edw. Rutledge Timber Co.)
Jensen, Irving R., R. C. '16-'17. (U. S. Forest Service, Essex, Montana.)
Johnson, Herbert Wm., ex-'17, Boise, Idaho.
Jones, Renaldo Vincent, ex-'15, Albion, Idaho.
Jones, William McKinley, Nampa, Idaho.
Kambridge, Antone J., ex-'16, Genesee, Idaho. (Farmer,)
Keefe, Frank, ex-'15.
Keyes, George W., ex-'22, Challis, Idaho.
Kingan, Fred, ex-'22, Boise, Idaho.
Lommason, Thomas, ex-'17, Colfax, Wash.
Lundstrum, F. J., '11 B. S. (For.), Lewiston, Idaho.
Martin, Ernest M., R. C. '19-'20, Weiser, Idaho.
Mason. Alvin Marion, (Special), Spokane, Washington.
Massey, Ivan M., ex-'23, U. S. F. S., Warren, Idaho.
May, Henry W., R. C., '19-'20, U. S. F. S., Warren, Idaho. (District Ranger.)
Malmsten Henry Elof, '17 B. S. (For.), U. S. F. S., Ogden, Utah.
McMullin, George Leiby, ex-'18, 251 Bush St., San Francisco, Cal.
Martin, Paul J., ex-'19, 1200 Old National Bank Bldg., Spokane, Wshington. (Insurance Business.)
McNett, Gail, ex-'16, Rathdrum, Idaho,
Miller, Lilas Warren, ex-'22, Nampa, Idaho.
Miller, Robert Adolph, ex-'22, Twin Falls, Ida.
Moody, Virgil Carlton, '17 B. S. (For.), Hope, Idaho.
Morris, Leo Francis, ex-'16, Weiser, Idaho.
Morrison, Frank Bernard, ex-'22, Barber, Ida.
Newkick, Edwin Ely, R. C. '16-'17, Easthampton, Mass.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EDITORIAL STAFF

CONTENTS

Dedicated to

CHARLES HOUSTON SHATTUCK, Ph.D.

First Dean of the Idaho School of Forestry

whose keen foresight, sound judgment and untiring devotion carried the Idaho School of Forestry through the uncertain period of establishment and laid a foundation which makes its future secure.

IN RETROSPECTION

By DR. C. H. SHATTUCK

What can be written which may be of interest to those who con the pages of "The Forester" for 1922 by one who turns back through history some thirteen years to the early struggles and small beginnings of the Idaho School of Forestry? The present writer arrived in Moscow September 1st, 1909, having moved three thousand miles in order to take charge of this recently established department for the state of Idaho.

Memory Pictures

Memory records the picture of the dust covered little town, as Moscow then was at the close of a long dry season, without one foot of pavement, either with no sidewalks, or more or less dilapidated ones made of boards mostly well worn and badly warped by the summer sun, the only bits of concrete walks being in front of the Hotel Moscow, the First National Bank, and Davids Department Store. So much for Main Street.

The front of the Administration Building and Morrill Hall constituted the chief college buildings, at that time the President's office being in the "Gym." The Campus was brown, uncut, and, save for the line of trees on either side of the main drive, was practically void of trees and shrubbery.

The Forestry Department, as I soon learned, then consisted of one 7x9 office on the first landing of the stairway in Morrill Hall, one office desk, one office chair, one other chair, and one professor in charge. In fact if there had been even one student the "oneness" would have been complete. The surroundings were lonesome and the solitude oppressive, and, as on that first day I sat alone in my little office, an utter stranger in the big, new State, I thought of Cowper's lines, "But grant me still in my retreat one friend to whom I may whisper 'Solitude is Sweet.'" However, I had little time for such musings. I soon found that one friend, and many more, who have proved to be the friends of a lifetime, and whose interest in forestry, warm sympathy and hearty cooperation for and in all lines of forestry work were an ample stimulus, and at once not only dispelled all feelings of lonliness, but inspired me to the utmost exertion in the various lines of the many sided subjects of Forestry in Idaho.

Early Friends

The first faculty member to call on me with offers of co-operation and kindly suggestions was Dr. J. M. Aldrich, now of the National Museum, Washington, D. C., who was then in charge of Zoology and Botany. The first Idaho lumberman was W. D. Humiston who had recently taken charge of the Land Sales Department of the Potlatch Lumber Company. I found him to be well informed on Idaho forestry conditions, and intensely interested in the future of the forestry department. He made many helpful suggestions and assured me of the hearty co-operation of his company in all that pertained to the good of the forestry department, and offered me the use of the company's cruising records and cuts of Idaho Timber in the preparation of the first forestry bulletin which it was decided should appear at once, as no announcement of any kind had been published relative to courses, etc. To Major Frank A. Fenn, then Supervisor of the Bitterroot National Forest, probably more than to any one man, is due the greatest amount of credit for effort put forth to establish a department of forestry at the U. of I. In the early years of the department when funds were not to be had to defray the expenses of special lecturers, Major Fenn on several occasions favored the department, entirely at his own expense, with a series of most excellent and practical lectures on various phases of forestry. He also made it possible, by furnishing horses and equipment, for members of the department to visit his forest, collect plants and wood speciments, make growth and fire studies, etc. Mention should be made of the efforts put forth by William Deary and A. W. Laird, the active managers of the Potlatch Lumber Company. These men not only allowed the faculty and students the freedom of their large mills and camps, but donated timbers and lumber for seasoning and kiln-drying experiments, stumps and other material for distillation experiments, and actually furnished maintenance, horses, etc., to members of the department in making fire and growth studies, land clearing experiments, etc. It is a pleasure here to record that their every early pledge of support has been kept and that to this day the Potlatch Lumber Company and those in charge are the staunchest supporters

of the School of Forestry. The material and moral assistance given by this great organization should never be forgotten by the professors and students who may be connected with the School in the future. W. G. Weigle, Supervisor of the Coeur d'Alene National Forest also favored the struggling young department in many ways in addition to giving time and lectures at his own expense. Many other foresters and lumbermen showed a kindly spirit, encouraging students and faculty by their offers of co-operation and assistance.

First Efforts

I was soon very busy in the preparation of the bulletin above referred to, and when it was finished "The Star Mirror" ran the entire announcement in a special edition of the paper. This was very generally and generously copied by many papers in the state, thus giving the department a wide and unexpected publicity. This resulted in attracting a few students even though there were but two weeks until the University was to open. Two four year courses were offered, one conforming in a general way to the requirements of the Agricultural courses with forestry as the major subject and the other embodying more of biology and mathematics, and handling the forestry subjects in a more technical manner. These courses were approved by the faculty at their first meeting just before school opened. Then it remained to be seen if any students were to elect these courses, General Forestry being the only course required and that only of certain of the Agricultural students then numbering in all about thirty.

First Enrollment

By the close of the first day of enrollment (quite an anxious day for me) six students, Wadsworth, Fenn, Denning, Kendall, Herman and Decker, had enrolled for the technical, or as it was then called, the long course in Forestry, and some ten or twelve "Ag." students had enrolled in General Forestry. The next day Hillman, McCurry, Thornton, Lundstrum and Hockett came in for the long course which completed the enrollment for the first year. Thus with but eleven regular students the department was organized for its first years work, its office having been moved to the third floor of Morrill Hall adjoining the lecture room and laboratory which had been set aside for class work.

From the very start there was much constructive work to be done, especially since it devolved on one lone "Prof" to do everything. Aside from the regular laboratory and lecture work, which was enormously heavy, field work must be mapped out, field trips made, articles written, public lectures given, mills inspected, microscopic and lantern slides made, herbaria prepared, equipment and apparatus ordered, besides the routine of faculty and university committee work, and as though this were not enough an unusually heavy correspondence soon developed. I shall never forget that first year with its complex of new duties, which, in carrying to completion, often kept me "at it" till well toward midnight. Had I not brought with me a very full line of well organized illustrative material, consisting of herbarium specimens, microscopic and lantern slides, etc., it would not have been possible to have given the heavy courses offered. But at the close of the year I was able, like Mark Twain in describing life on Sunday, to write "pulled through," glad it's over, never again, etc., in my diary.

Origin of the Arboretum

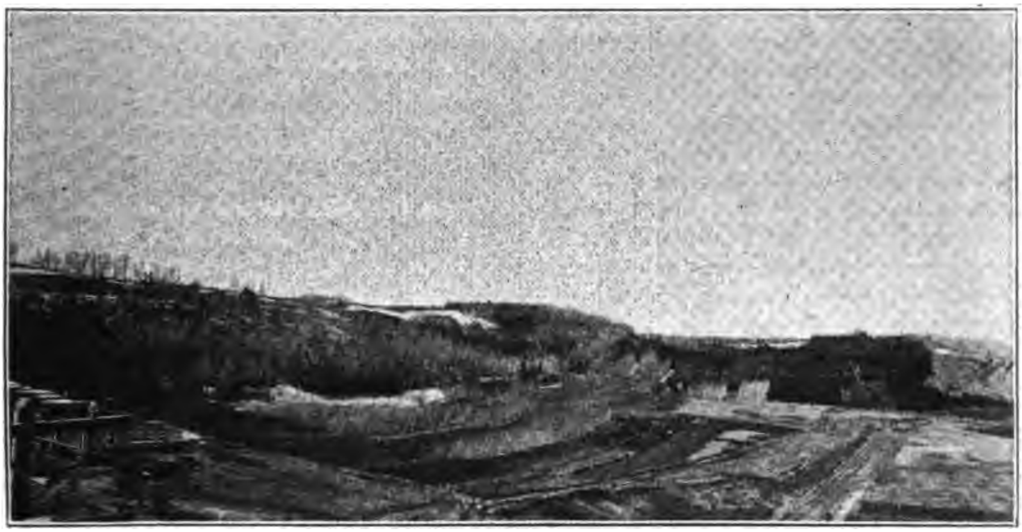
Soon after the school opened the Board of Regents held its first meeting and I was invited by President McLean to meet the members in session. They asked me if I had outlined any project of state wide importance upon which my department could begin operations, whereupon I proceeded to outline the work of the department as falling under three main heads, viz—Educational Forestry, courses, lectures, etc.—Destructive Forestry dealing with such subjects as lumbering, logging, and land clearing, and Constructive Forestry, or the planting of new forests, wood lots, wind breaks, regeneration of cut over lands, etc. I also urged the need of general planting of woodlots, shade trees, etc., in many of the treeless, but irrigable parts of southern Idaho, also the necessity for experimental planting in order to determine what trees could be successfully grown in different parts of the state with the idea of furnishing at cost a limited number of tested trees for shade, shelter, and decorative purposes. I suggested the establishment of the arboretum which met the approval of the board and I was asked to select a desirable site for the same. Much to the surprise of some of the members I asked for the steep, thistle-covered hillside, about fifteen acres, then an unsightly disfiguration back of the campus which no one seemed to want, and which could not be kept free from noxious weeds of every kind. One member of the Board generously suggested that I could have an "acre or so" of good level ground. I had

given this matter of site much careful consideration and knew exactly what I wanted but had not dared to hope that I could get this entire tract. I was therefore much surprised, elated, and delighted when they generously wished me success with the plat, although I felt sure that they all thought I had made a very poor selection. It was because of the general roughness of this tract that it was possible for the Department of Foretry to obtain so large an acreage in such advantageous proximity to the campus, and as it has since turned out, the very best forestry and arboretum site any where near Moscow. The north slopes are protected from the drying summer winds and direct rays of the sun and always receive liberal deposits of drifting snow and are constantly fertilized with Palouse dust which has not only built up the topography of the entire Palouse region, but has made the fine grained and fertile soil on these north slopes very deep and most ideal for rapid tree growth. The late melting snows tend to retard the growth of vegetation in the early spring on the north slopes thus enabling the less hardy species of trees to remain dormant until most of the damaging spring frosts are over. In fact it would be impossible to combine more favorable conditions in one site than we find in that which the arboretum now occupies, and the wonderful growth of the great number of species, as well as the beautiful campus background thus formed, amply attest this fact.

Early Struggles

So much for favorable combinations contributed by nature and the accident of convenient location, but the Arboretum as we know it today was not to come into being without its birth throes and many set backs due to lack of funds, want of exact knowledge of seasonal and climatic conditions, trained assistance, etc.

The forestry budget was distressingly meager, for when the department was established the salary of the professor to be in charge was practically all that was alloted in the way of a budget. I soon found that to purchase young trees for this tract would cost several thousand dollars and that the express on these would be almost as much as the cost of the trees since the bulk of the species desired would have to be purchased from eastern nurseries more or less widely separated. After extensive correspondence it was very evident that only a small part of the tract could be set to transplants in 1910 for want of funds. Finally two relatively small orders were placed, one with D. Hill and Co., Dundee, Illinois, and the other and considerably larger order, because of the liberal discounts offered by Dr. C. A. Schenck, with the Biltmore Nurseries, Biltmore, N. C. I would have preferred having this order from a northern nursery, but could find none offering either the wide variety of trees or reasonable price obtained here.



The University Arboretum in 1922

But much to my surprise the trees did fully as well as those coming from Dundee.

It was evident that we must grow our own trees from seeds, and seed-beds as now located, were laid out early in March 1910 (the dryest spring and summer ever known in Moscow). I was assured that no water or shade would be needed for these beds and we started out with that idea planting the seeds fairly shallow as I had seen them successfully planted in the great seed plots at Biltmore. Then we waited for the bursting of the seed-coats and the springing forth of the millions of seedlings, but alas! what a disappointment awaited us, for the March wind was the hottest and dryest ever known in Latah County, and the blistering sun soon dissipated every vestige of surface moisture, as a result only a very very few seeds germinated and most of these soon parched and blew away. Mr. Price and I soon saw that we were confronted with a stern fact (not a mere theory) and that if our beds were not both watered and shaded we were doomed to record a most humiliating failure. Meanwhile our orders of trees had arrived, the ground which had been plowed early, must be prepared and these trees set at once. There was much to do and all at once, very little help, and practically no money. However, by commandeering the good-natured campus engineer and a quantity of old piping, wreckage from the former "Ad" Building, we succeeded after much hard labor, in bringing water to our desiccated seed beds; and by impressing the entire forestry department we finally erected lath frame shades and in about a month got all the seedlings set out, the ground becoming very dry before the latter task was finished. The parching sun killed many of these trees in a few days, and every day added to the number of "casualties" until I was fearful that the entire undertaking would be a failure. However, a few cool days with moist winds which gave most of our sick trees a life lease until they could strike new roots into the fine moist soil of the cool hillside.

Necessity--the Mother of a New Method.

Mr. Price replanted many of the seed beds, placing the seed thickly an inch or more in depth, a method of his own still very successfully used by him. Soon we had a number of beds thickly set with strong seedlings, but the ones first put out in strictest accord with approved Eastern and German planting methods germinated very poorly, mostly not at all, and were very slow in starting growth, never equalling those planted deeper. Thus, a valuable lesson was learned almost at the outset which has contributed immeasurably to the success of all the extensive plantings which have done so much toward making the arboretum a success as well as all the tree planting work of the state. The young trees were dying rapidly and the seed beds were mostly bare when on June 20th I left the campus for my summer's work in the Bitterroot Mountains and the never to be forgotten experiences in the ravishing fires of 1910. I confess I was greatly discouraged over the prospects of the arboretum and nursery. Everything looked bad, the ground was the dryest I have ever known it to be at Moscow, the trees were sick, and so was I at heart, for I had never had to contend with so many unfavorable conditions before. Everything seemed to be against us. However, on returning in September I was highly gratified to see that many of the trees were not only alive but had made vigorous growth, and the seed beds, while late, had an excellent stand of the most lusty seedlings I had ever seen, the combined results of method, soil and care.

From this time on the success of the arboretum and nursery was assured, and it remained only to continue to plant and transplant as fast as we were able until the entire bare amphitheater was thickly set in trees of every species possible to obtain or to grow. Soon the ground was covered with green, slowly becoming denser and higher, and gradually forming the beautiful back ground to the campus and athletic field as we know it today and as those who come after us will cherish even more than we have done, because its beauty and magnitude are even yet only in their infancy, many years being required for most of these trees to reach maturity. The nursery and distribution phase of this tree planting work is not so readily appreciated because the results are so widely scattered and therefore harder to see and measure.

Has Made Many Homes More Homelike

Yet many Idaho homes in both towns and country, as well as many parks and streets, are much more inviting because of the vast

number of thrifty seedlings sent out over the state each year. These are little appreciated at first, but like the arboretum, become more attractive each year. I meet these trees in all parts of the state and probably appreciate more than most people the splendid growth they are generally making as well as the beauty and value which they contribute to property either private or public.

Too much credit cannot be given to our Forest Nurseryman, Mr. C. L. Price, who has been in charge of all the tree setting and seed planting work since March, 1910. To his skill, devotion, and untiring efforts more than to the labor of any one else is the success of the work chiefly due. He has for the past twelve years put his entire life most unstintingly into this work and has pressed forward often unaided and alone in the face of many drawbacks and difficulties not here possible to mention, many of which would have discouraged a man of less sterling qualities of character and determination. No words of mine can properly portray his devotion to this work nor bespeak for him the appreciation and reward which is his just due. He is doing much for the future beauty and attractiveness of Idaho. "The groves were God's first temples" and the spreading boughs of a mighty oak or elm has determined the place of abode (the old homestead) of many succeeding generations in many lands who have found rest and comfort beneath these sheltering branches. A home without trees lacks much. He who plants a tree plants not for himself alone, for those who come after him may often enjoy the benefits of his labors even more than those of his own generation. Thus this work is doubly worth while, blessing not only the worker but those who live after him.

In recounting this simple story of the early tree planting struggles of the Department it is hoped that students of the School of Forestry and all students and friends of the University of Idaho may come to know something of what it has taken to establish and care for the wide range of species, many not growing elsewhere in the state, which now point their cathedral-like spires heavenward, not only in the arboretum but in many other parts of the state, adorning the landscape and improving property in town and country and in the arboretum, instructing all who will take time to learn about trees.

It is the sincere wish of the writer, who counts Idaho as his home, that this work begun under great difficulties, now only memories, may have the support of all good people in the state; and that as time goes on an increasing number may avail themselves of that aid which this project was inaugurated to give.

XI SIGMA PI

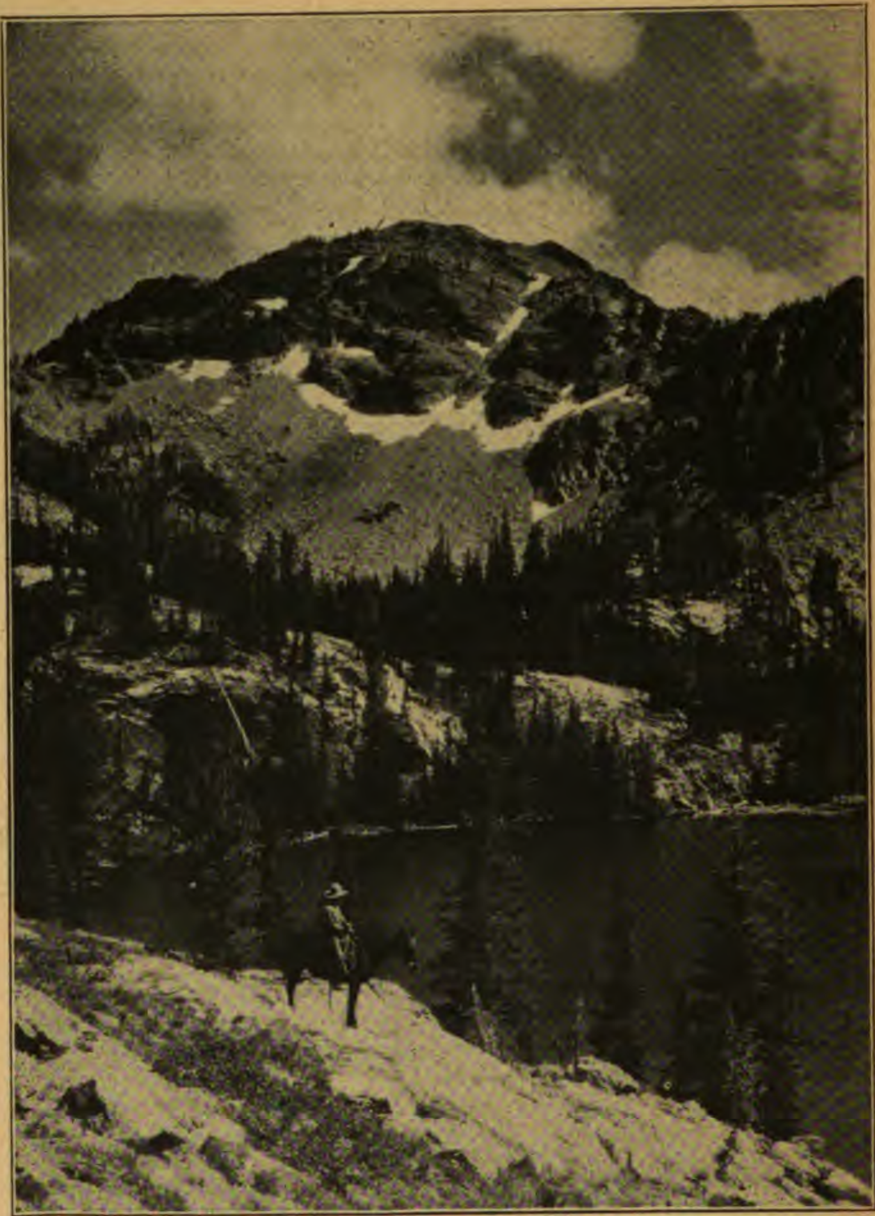
Xi Sigma Pi, the oldest honorary forestry fraternity, was founded in 1908, in the College of Forestry and Lumbering, at the University of Washington and since that time five new chapters have been added. Epsilon chapter was established at the University of Idaho in 1920, and now, Idaho forms a link in a chain of chapters from the Pacific to the Atlantic.

The objects of the fraternity are to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry, and to promote fraternal relations among earnest workers engaged in forest activities. The idea of scholarship and leadership in forest activities has always been uppermost in the selection of members. As much weight is placed upon a man's practical ability, such as adaptability to forest work or lumbering, capacity for leadership, and promise of attainment, as is placed upon his scholastic work. By this means of grouping, and by stimulating the desire of the underclassmen for election to the fraternity it is hoped that these objects may be attained.

To be eligible for membership a student must have completed two and one-half years of standard college work in an approved school of forestry, three-fourths of his grades shall have been above 80 per cent, and he shall not have received any failures in forestry subjects. He shall also have shown creditable interest and activity in practical forestry work.

The newly chosen members for the present year are:

Russell M. Parsons, '23; Herman C. Baumann, '23; Prof. C. W. Watson; P. D. Sharma, graduate student.



THE SCENIC RESOURCES OF IDAHO

By ARTHUR M. PIPER
Assistant Geologist, State Bureau of Mines and Geology

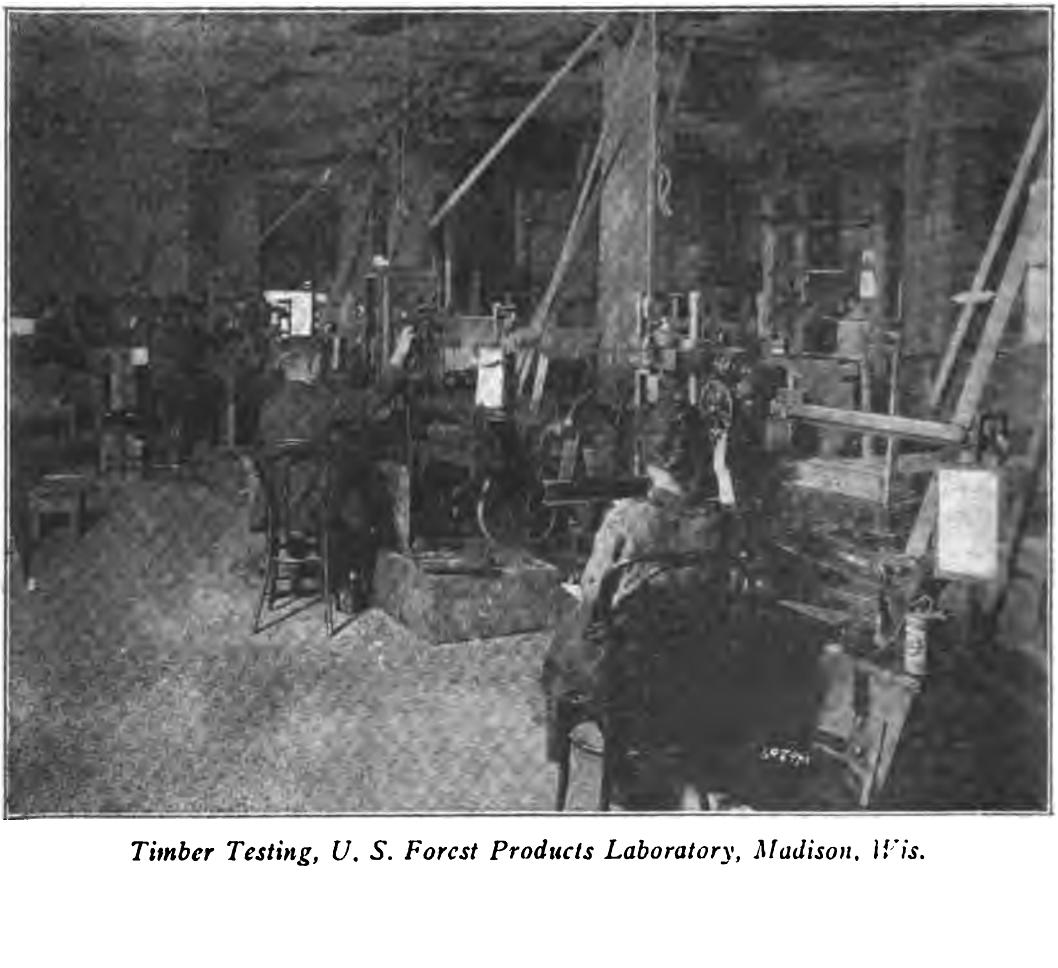
With a potential value far in excess of any of her minor industries, the scenic resources of Idaho are at present little known, less exploited and least advertised. With the exception of the glaciers of Glacier National Park and the multiplicity of the geysers of Yellowstone, the boundaries of Idaho enclose points of scenic beauty that equal, and in many cases surpass, any of those to be found in all our national park system. The massive grandeur of the Tetons, the placid beauty of Payette, Coeur d'Alene, Pend d'Oreille and Hayden

Lakes and the jagged skyline of the Sawtooth Mountains are accessible to some degree to the automobile tourist and are obtruding themselves gradually on public attention. Thoroughly, yet unnecessarily, hidden from the highways and even more deserving of notice, however, is the Grand Canyon of the Snake River and the contiguous area of the Seven Devils Mountains.

Deeper by more than 2000 feet than the canyon of the Colorado, the Grand Canyon of the Snake makes its sinuous northward traverse between the states of Idaho and Oregon. Not a study of brilliant colors comparable to the "Garden of Allah", as is the Colorado, but rather a symphony of delicate tones suffused over a base of dull volcanic rocks, its charm is kaleidoscopic. Its jagged walls, here a blue gray, there of a greenish tone, with a bold, red sweep of iron stain yonder and a jaunty touch of. yellow green lichen at hand, climb 7600 feet from the roaring, foamflecked river to the

towering timber clad slopes of the Seven Devils. Mountains. At mid-day, we see an olive green river, oily in the eddies and backwaters, wild and seething over the rapids, losing itself in the soft lavender haze of July which grades into a deep azure blue overhead. An occasional bench, seemingly a stone's throw away across the river, relieves the regularity of the saw cut canyon with its clump of delicate dark green timber. It is only by glancing at the lofty, yet identical, yellow pine at hand that one retains his proper perspective in the vastness of the place. Again at dusk we stand on the Canyon's brink. Below is a tarnished silver ribbon in the impenetrable blackness of a seeming void which softens to a rich living maroon in the near shadows; opposite us the timber clad summits glow in the reds and yellows of a setting sun. Inadvertently, we drop into a silent speculation of the abstract.

Truly, we of Idaho need not cringingly acknowledge our state and leave the floor for the artificial attractions of the land of the "native son".. The mountains of Idaho, jewelled with untold numbers of lakes set in patches of undying snow, should be the Mecca of pleasure and relaxation-seeking tourists. Advertising only is needed to force the establishment of routes of easy access. Let us foresters, geologists, surveyors, sportsmen, who see and learn these beauties, start the ball in motion; may we create a just state pride by persistently "passing the word."



Timber Testing, U. S. Forest Products Laboratory, Madison, Wis.

FOREST UTILIZATION

A Public Service Rendered by the U. S. Forest Service

By S. V. FULLAWAY
Office of Products, U. S. Forest Service, Missoula, Mont.

The Field

It has been aptly stated that the problem of Forest Conservation, which today stands out as one of the vital economic issues of the nation, must be solved by the two main lines of endeavor, the first is by stopping further devastation thru such measures as will afford adequate protection and regulation of our remaining forests and will put our forest-bearing lands on a permanent producing basis; the second is the curtailment of the annual drain upon the remaining forests by more complete and scientific use of the trees cut, a use arrived at by an accurate knowledge of the properties of the various woods and their economic use. The activities of the United States Forest Service, logically, cover both of these fields. Those in the latter field, that of Forest Utilization, are carried on chiefly by the Forest Products Laboratory at Madison, Wisconsin and the Forest Service Products offices in several of the western districts of the Forest Service.

Congress, recognizing the national importance of Forest Utilization, annually appropriates funds to be devoted by the Forest Service to investigations and experiments to promote economy in the use of forest products and for commercial demonstration of improved methods or processes in cooperation with individuals and companies. The Forest Service seeks to promote economy of use, first, thru learning and making known the actual situation as to demand and supply of all forest products and second, thru investigations to determine how forest products may be put to better service. These two broad phases of the work are designated "Forest Economics" and "Forest Products" respectively. The problems of Forest Products give rise to two general classes of studies; studies of the natural qualities of wood and methods of handling and using it that will give better service and studies of waste and its possible reduction or utilization. Problems of Forest Economics give rise to studies of present supplies, consumption, uses, markets and prices, and are by statistical rather than experimental processes.

The activities of the Forest Products Laboratory fall largely within the field of Forest Products. Those of District Forest Products offices deal with both Forest Products and Forest Economics.

The Forest Products Laboratory

The national need for research in forest products was recognized from the earliest days of the old Division of Forestry. Prior to 1910, due to scanty appropriations, research in forest products was carried on largely in a cooperative way with various universities where Laboratory facilities were available. It became more and more evident that greater facilities for research were necessary. It was also recognized that centralization was essential to the success of the work. As a result, the Forest Products Laboratory was established by the Forest Service in 1910 at Madison, Wisconsin, in quarters furnished by the University of Wisconsin. This was made possible by the efforts of far-sighted men in the Forest Service who realized that, if our lumber and other wood using industries were to keep pace with other branches of our industrial life industrial research in wood was necessary.

From the modest beginning in 1910 with a personnel of approximately 40 people, the Laboratory force had increased to about 80 persons at the beginning of the war. Up to this time, the work was carried on by Federal appropriations and some funds from cooperative work with various manufacturers. During this period, studies were confined to a large extent to determining the fundamental properties of wood. But, altho no marked increases in appropriation were secured, the scope of the work was gradually broadened and contact established with the principal forest products industries.

At the opening of the war, the work and organization of the Laboratory was brought to the attention of the various military and naval authorities. As a result, military and

naval demands for rapid output of reliable data caused an increase of the Laboratory personnel to more than 450 at the time of the armistice. Funds for this purpose were made available by the cooperating departments.

A survey of forest products needs in relation to national defense brought out clearly the vast importance of wood and other forest products in warfare. An attempt to cover the accomplishments of the Laboratory during the war is entirely beyond the scope of this article. Some of the major activities were the contributions in such lines as kiln drying of aircraft wood; work on design of aircraft parts; development of water-resistant glues; airplane propeller work; kiln drying of heavy woods; war time box work; participation in problems of wooden ship building; cooperation with railroad administration; furthering the chemical warfare campaign; wood cellulose for explosives. The value and efficiency of its work had so fully been demonstrated by the close of the war that the expenditures for research work were in excess of $750,000.

Since the war, the Laboratory has been busy applying its war discoveries to peace time activities and developing new lines of research in wood. It has just started in a field of unlimited possibilities altho it is estimated that already the direct savings from its researches have amounted to more than $70,000,000. It is the present personnel, organization, and problems which are now of greatest interest.

The work of the Laboratory is in charge of a Director, an Assistant Director and a staff comprised of the heads of the different research and administrative sections. A sharp distinction is drawn between administrative, service, and investigative work. In this way, research men can give their whole thought to problems in hand. The personnel now consists of some 220 people. The men are recruited from the professions of chemistry, engineering, forestry and pathology, also from the different grades of clerks and skilled laborers.

The technical work is divided among seven sections, each unit devoting its investigations to certain well defined fields. In addition to the research sections, there are four service units carrying on many functions, such as finance, engineering, maintenance, personnel details, etc. Here also is located the office which handles the editorial work. This office is responsible for the general dissemination of the results of all the Laboratory's research. Coordination of research activities is accomplished thru the Director's office.

The Section of Timber Mechanics deals with the mechanical properties and uses of wood. Its problems include those relating to the strength of wood; strength and design of manufactured articles; effect of kiln drying, steaming and boiling, and preservative treatment upon the strength of wood; container construction and methods of packing. The equipment of this section is varied and complete. It ranges from such apparatus as the new million-pound testing machine, which will test the strength of a column thirty feet in height, to machines for testing small clear specimens of wood 2 x 2 x 30 inches. Mention should be made of the two tumbling drums in the box laboratory of the section. The larger will handle boxes weighing as much as half a ton.

Wood treatments and laminated or built-up construction are studied by the Section of Wood Preservation. Wood preservation, problems of gluing, water-resistant glues, and protective coatings for wood are within its field. This section is thoroughly equipped. Among its various equipment is the large pressure treating plant, glue mixing and spreading machines, hot and cold presses and other special apparatus. One activity of the section is of particular interest. In addition to a large number of actual service tests of treated timber, which are inspected at regular intervals by members of the organization, it acts as a clearing house for all such records in the United States, thus making available reliable results based on actual service as to the durability of treated and untreated timber.

The chemical utilization of wood is the field of the Section of Derived Products. Its investigations include those dealing with the production and utilization of products of wood distillation and extraction; chemical composition of wood; oils, gums and balsam; chemical composition and physical characteristics of wood preservatives; ethyl alcohol from sawdust; uses of hydrolyzed sawdust. The usual chemical laboratory equipment with additional specialized equipment are used in this work.

The Pulp and Paper Section is engaged in studies of manufacturing methods and suit-

ability of various woods for pulp, paper and special products. Its work has been focused primarily in determining the value of our different species for pulp and paper. More than 70 different species have been studied. In cooperation with the pulp and paper industry, investigations have been made to determine the methods to combat the tremendous losses which occur in the storage of pulp wood and manufactured pulp due to fungus decay. The equipment consists of apparatus to make wood pulp by any of the commercial chemical or mechanical processes and convert the pulp into paper by cylinder or Fourdriner process. This is of course on a laboratory rather than a commercial scale.

Experimental and applied kiln drying, physical properties, identification and structure of wood are the lines of investigation pursued by the Section of Timber Physics. The underlying fundamentals of kiln drying lumber have been thoroughly studied. Kiln drying schedules have been worked out for a number of important species and two types of dry kilns, one especially adapted to drying refractory hardwoods and the other to rapidly drying softwoods, have been developed. A great deal of work has and is being done on the structure of wood and wood identification. Six kilns of commercial size are operated by the section which also has much special apparatus for its work.

The technical study of the efficiency of wood conversion processes is assigned to the Section of Industrial Investigations. Investigations are made of the methods and practices in the lumber and wood using industries, lumber grades, lumber specifications, mill scale studies and similar problems. One service which the section is rendering the public thru its wood waste exchange, is the bringing together of wood waste producers and wood waste consumers. This whole field of investigations has been exceedingly limited until recently owing to the fact that an adequate organization has not been available.

Pathological work, largely a study of fungi and their effect on wood in its many fields of use, is handled by the Section of Pathology. This is a cooperating office of the Bureau of Plant Industry. Among its many problems are decay of timber, molds and stains in manufactured wood products, and antiseptic properties of wood preservatives.

Obviously, the work of an organization like the Forest Products Laboratory consists of more than the solving of its investigative problems. Of equal importance is the dissemination of the knowledge acquired in a manner which will best aid in the efficient use of our timber resources. Every effort is made to reach the entire wood industrial field thru a variety of mediums. Correspondence, which averages 3000 letters a month, is one of the mediums used. Special reports and articles for publication in the press, trade and other journals are also effective means. Many other methods have also been used. As an outgrowth of the war time activities of the Laboratory, a demand from the industries resulted in the Laboratory offering several educational courses. The two weeks course in the kiln drying of lumber has been given every month for two years. A tuition fee of $150.00 for each student attending is charged to cover the actual costs. Over two hundred men from the lumber and wood using industries have taken the course to date. Five courses are now being given in the western states in order that the western industries may be able to gain the benefits of the course. The course in box and crate construction and design is given at the Laboratory every second month. This is a weeks course for which a $100.00 tuition fee is charged.

Cooperative service is also offered by the Laboratory by means of research service at cost to the industries. The Laboratory is maintained and operated by appropriations made each year by Congress. The appropriations are based upon general estimates of work to be undertaken during the ensuing fiscal year, so that the appropriations for the Laboratory's use must be spent in accordance with an annual program of work. In keeping with the purpose of the Laboratory, it is the policy of the Government to make this program, in so far as possible, one of fundamental research, the results of which will be of the greatest benefit and of most lasting value from a public standpoint.

Recognizing the further opportunity for service, the Laboratory has adopted the policy of undertaking cooperative work up to the point where it can be handled efficiently and without disruption of its regular program of fundamental work. Such service is rendered at actual cost except in cases where

the work is of direct value in furthering the regular research program of the Laboratory. Then the cost is often divided between the Laboratory and the cooperator. This method of service in no way commercializes the work of the Laboratory because all information available on any phase of wood utilization is furnished free upon request or thru personal consultation.

The District Products Offices

While not a part of the Laboratory organization, the work of the Forest Products offices in the western districts is intimately tied in with the Laboratory chiefly thru furnishing a close contact with the industries in these districts. One or more men are assigned to each of these offices and, as is the case with all activities of the Forest Service, handle the wood utilization work in these regions under the jurisdiction of the District Foresters.

As pointed out in the case of the Laboratory, the solution of investigative problems is not the only activity of a properly balanced research organization. The dissemination of knowledge already acquired by investigations in forest products and forest economics is therefore one of the major activities of the District Forest Products offices. In fact, due to the naturally less intensive methods and practices of the industries in the West, this activity is of first importance. Methods of accomplishing this end are many and varied. Some of these followed are: correspondence, including the distribution of literature; interviews both in the field and office; actual demonstrations of practices and processes; articles for the press, trade journals and simillar publications; and addresses at meetings of lumber, wood using industry and allied associations.

Another activity is that of investigations in both forest products and forest economics which are of local character. Some are carried on in direct cooperation with the Laboratory. The District Forest Products men also perform the function of representing the Laboratory in the region. Still another is that of maintaining additional contact between the Forest Service and the industries as a result of the close connection this work has to that of the industries.

Assistance and advice to the local National Forest organization are a very important part of the work. This is chiefly in connection with the problems arising from the many forest improvements, which are constructed and maintained by the Forest Service, and the appraisal and sale of National Forest timber.

Aside from the general duties of keeping in touch with the problems of the industries and attempting to promote and secure the most efficient use of all forest products, some of the specific projects carried on by the Forest Products offices should be mentioned. Studies to determine the best practice of air seasoning lumber and current kiln drying practice are of real importance to the lumber industry. Current inspections of actual service tests of treated timber and the initiation of new projects of this nature are building up reliable data on the value of different preservatives and methods of treatment as well as the durability of treated and untreated timber.

The collection of statistics on annual lumber production, lumber manufacturing costs, wholesale and retail lumber prices, log and stumpage prices, and output or time studies of the many phases of logging, are not only of value to the lumber industry but necessary for the proper appraisal and sale of National Forest stumpage. Market studies and studies of the secondary wood using industries are also within the scope of the work.

Practically all the phases of Forest Utilization are gradually receiving the attention of Forest Products investigations. There is much yet to be done as time and funds are available but already there has been acquired a great deal of knowledge which is available to the public. The Forest Service is attempting to spread this knowledge with the resources at hand. The public should also come to the Forest Service with its forest utilization problems.

THE SCIENCE OF SMOKE-CHASING

By C. W. CHENOWETH
Assistant Professor of English

To provide a scientific approach to my problem, I shall first limit my field, and second, my audience. My subject is smoke-chasing and my audience smoke-chasers. I shall not stray out of my field, no others should stray into my audience. My responsibility ends where the reading begins.

Smoke-chasing may be defined as that activity upon which all phases of Forestry rest, the smoke-chaser, as the man whose labor enables all others in Forestry to rest. The first was my reason for going in, the second, for coming out. I went in with a heart eager for adventure. I came out with a head crowned with wisdom. The experiences that accomplished this transfer provide the sole content of this study.

On this account my treatise may well supplement academic curricula. The student who has completed his study of what smoke-chasing ought to be, may here quickly learn what smoke-chasing is.

It must now be apparent that the proposed content is rigidly scientific. It remains to make clear that the contemplated form is equally so. In this connection, attention is directed to the headings, sub-headings, and side-headings, inserted expressly to give a form as exactly analytic as the content is thoroughly scientific.

The Etiquette of Smoke-chasing

The etiquette of smoke-chasing should be studied under three separate divisions, conversation, clothing, and table manners.

CONVERSATION

A man cannot be known by what he says, but everybody thinks he can. What his speech exhibits the man possesses, is a fallacy which might just as well be the truth. Groundless as it is, however, this wide-spread conceit demands caution in conversation. But the caution which is best to advise is hardest to practice, namely silence. Since therefore the best is impracticable, the next best must suffice; ask questions, don't answer them. The man who asks is of course obnoxious, but the man who answers is a fool. The first alternative, is the less of two evils. Therefore think fast and get in the first thrust. "The best defense is a strong offense".

"Well, men, how's business?" will do for an opening. This stroke should be dealt as you swing off your pack and reach for the red bandanna. The character of the question is especially pertinent. "Men" is inclusive and "business" is indefinite. It results from this, that each man knows that the talk is to him, but no one knows what the talk is about. For of the thousand and one things that each man does, not one can be dignified as a business. Their hesitation is your opportunity.

Let it be known at once that you sacrificed a good job to come to the woods, that you love the forest and revel in its wonders. If it can be managed, the ranger should witness this enthusiasm. The effect on him is likely to be favorable, unless other new men have passed through before you. In that case the story is getting pretty old by the time your turn comes. But the chance is worth the risk. The best place that he can give you is not tremendously good, the worst is but very little poorer. The difference between them is in their accessibility to the grub supply. But there are only a few stations on each ranger district to which the pack train is unable to go, where as a consequence, the occupants must thrive on the wonders of nature and such grub as they can pack in on their backs. The worst that can happen is an assignment to one of these; mine were always this kind. Furthermore, if you do exasperate the ranger with your talk, you can be assured that others have done likewise. So that however much he might wish to hang you out on some flimsy fringe of the grub line, he may not be able to do it because of the others already dangling there. If you can keep silent it is best, but if you must talk play for big stakes.

CLOTHING

The power of choice in the matter of dress relates to the "going in", not to the "coming out". But even here, volition is of little value, because it must function with reference to a number of bad options without a single good one. No matter what you wear it is certain to be wrong. The thermometer is

always batting a hundred or else flirting with zero. The batting and flirting will often take place in the self-same hour. It is hopeless to dress for such freakish occasions. Since therefore the selection is bound to be wrong, make it quickly, and the time saved in choosing, may well be used later in cursing the choice.

The baggage, at least, should include a tooth brush and a safety razor; at most, the addition of fishing tackle and ammunition. The latter are luxuries, the former necessities. You will probably use them little, but their possession is an evidence of correct antecedents. Before the end of the first month one's own incredulity will demand such evidence.

In regard to the "coming out" dress there is no opportunity to choose and consequently no chance to go wrong. Whatever can be had will always be right. The majority come out in gunny sacks. The utility of the gunny sack in reinforcing broken down breeches has long been recognized, but its availability for more ambitious ends is a recent discovery. A little work with a jack-knife can transform a gunny sack into a first rate shirt. Since this discovery most men in the woods have at one time or another profited by it. Hence if you can come out with a gunny sack shirt, your shoe soles lashed on with emergency wire, your breeches pegged together with a fish hook, and your hat scorched full of large holes you are in correct dress and are likewise lucky.

TABLE MANNERS

Whatever is efficient in this field is good form. Eating and smoke-chasing are inseparable adjuncts, with a preponderance of emphasis in favor of eating. It would be truer perhaps to say that while eating does not depend on smoke-chasing, smoke-chasing does depend on eating. Therefore if smoke-chasing efficiency is desirable, eating efficiency is at least equally so. This conclusion determines the following regulations.

When the cook taps the cross-cut saw, drop whatever you are doing and run for the wash place. Call out in a playful way some pleasantry to your nearest competitor to indicate that you have no serious purpose in running. But it is well to remember that he too is trying for the lead and is devising some strategy by which he may jockey you out of your position. The old timers know that it denotes efficiency to lead a crew up to the wash place and that it connotes disaster to follow one. Anywhere below fifth place in the wash line is inefficient. It indicates that you will either make a quarter-mile trip to the spring for more water or else execute your ablutions in the dregs accumulated from the cleansing of three or four men. The towel by this time will have become wet and odoriferous, so that in the process of washing, you will have exchanged your own dirt for a distilled compund of the dirt of the whole crew. Inefficiency here exacts heavy tribute. Find your place among the first five.

At the table, conversation should be scant. "Want some?", "Uh-huh," and "Huh-uh" are all that is necessary. The words of the question can be articulated with a jaw motion exactly coincident with chewing, the latter phrases may be uttered with the mouth closed. This makes it possible to carry on the necessary conversation without in the least retarding the process of eating. In this way the ends of efficiency are conserved.

After the others get through, make friends with the cook. He is lonely and will be cheered by your attention, you are hungry and may be appeased by the scraps. The advantage of the friendship is thus two-fold.

But tact will be required if the matter succeeds. Cooks are usually sensitive. The slightest bias toward the scraps as against his companionship, will spoil the plan if the cook detects it. Attention to him must appear primary, devotion to the food merely incidental. Accomplishment here gives plenty of food and a way of escape from the odium of gluttony.

Leisure in Relation to Smoke-Chasing

Leisure may be defined as the lapse of time between the end of one job and the beginning of another. It is well to remember that jobs end at the camp as well as begin there. Going to and from work is part of the work and is usually so regarded. Even the ranger himself admits it with reference to those cases in which the worker provides manual transportation for a cross-cut saw, a maul and an ax, two wedges and a peevey hook, a workman is scarcely ever seen with less. Both going and coming to and from work are included in the work. Leisure then may be further defined as that portion of time between jobs which

may, at the option of the individual, be spent in camp.

LEISURE AND EFFICIENCY

The amount of leisure depends on the individual. In a given situation, one man will find plenty, another will find less. Now which is the more efficient?

The answer to this question depends on the point of view. The ranger maintains that the man who finds little leisure is more efficient. But logic is against his claim. For if the man who finds a little leisure is efficient, he who finds much should be more efficient. There is no gainsaying this truth.

But the use of leisure is just as important as the possession of it. Space permits the discussion of only two phases, recreation and amusement.

RECREATION

One of the greatest problems of a smoke-chaser is to improvise a suitable program of recreation. The government has up until now ignored this essential. Nothing is provided, not even the ammunition for the improvement of marksmanship. It is a great tax on the ingenuity of men to supply this deficiency.

Long walks are indispensible on account of their benefit to the leg muscles. These suffer most from inaction. Walking likewise develops the vocal mechanism if in connection with it a coyote howl is cultivated. A proper skill in this vocalization enables one at any time to stir up a chorus scarcely distinguishable from a fraternity serenade.

Now and then a cougar looms up in the trail. That event does not call for an exhibition of marksmanship, on the contrary it means that by the time you reach camp, you will have recreated enough for that day. Agility should be the rule of behavior. The animal, however, must not be neglected. He is almost sure to take up the chase. This will require some additional speed. It is possible to outrun a cougar where the character of the terrain is favorable. If the ground is rough it is more difficult. In that case a shot or two fired into the air may dull the edge of his appetite. But the very act of drawing the gun and firing the shots will perceptibly slow up the runner, hence this expediency is not advised until all the possibilities of speed have been exhausted.

The pursuit must end before the camp is reached. It is considered bad form to rush into camp all winded and covered with sweat. One or two lapses into that sort of crudity may easily spoil a whole summer. First compose the difference with the animal either by sheer fleetness or random shooting, cool off and get wind, then stroll casually into camp and remark indifferently that you saw a cougar down the way. If you fired anv random shots, it is well to add that you think you "nicked 'im" the last shot.

AMUSEMENT

Amusement provision and bunk equipment are inextricably bound up together. Amusement is impossible when the bunk is inferior either in workmanship or material. Boughs are good for temporary purposes, but should not be considered for permanent use. It requires too much effort to keep them up. A bed canvass rightly adjusted to two poles, and these in turn to two blocks, can much better serve the ends of amusement.

1. Every lookout station has its old magazines, carefully preserved from year to year. These are always available for the employment of leisure not otherwise occupied. The value of the content of these magazines for the purpose of amusement is uniformly high, the advertisements no less than the fiction. Fiction, scientific matter, cooking recipes, and advertisements should be treated indiscriminately until the memory holds them all as clearly as the magazine does. After that the magazine may still serve the purpose of providing targets for pistol practice. But a conscientious smoke-chaser will scarcely care to deplete the next year's supply in this way, especially when tin cans will serve better.

During the learning process the magazine and the bunk should be kept within easy reach of each other. It is very disturbing, when one is reclining in a posture of relaxation, to be compelled to attempt to secure some article just out of reach.

2. In smoke-chasing nothing more abundantly repays painstaking effort than does observation. Amusement depends on keenness of observation.

With any tent, however carefully constructed, there is always an impressive flock of insects trying to get out and an equally impressive number trying to get in.

The habits of the two groups are entirely dissimilar. The components of the first group are grasshoppers and bumble bees. They are

always trying to get out. The components of the second group are "no-see-ums" and mosquitoes. They are always trying to get in. This second group has capacities that may become interesting but never amusing. It remains then to examine the possibilities of the bumble bee and the grasshopper.

Between these two again there is a divergence of behavior. The bumble bee on the one hand is always in motion. The rapidity with which he rushes from one position to another in search of an opening renders it necessary for the eye to function with an equal rapidity to keep track of his explorations. When he does finally escape the reaction from the eye strain assures to the observer a restful sleep.

The grasshopper on the other hand assays his task differently. Instead of the random gyrations he makes none at all. Like a chess player his moves are chronologically disparate, one follows the other but the interval is uncertain. On one occasion I observed a grasshopper in the same position for a period of five hours. During this time neither of us moved, except that at the end of the third hour I noticed a slight curvature of the left antenna and a backward stretching of the right hind leg. After some minutes, however, the contemplated move was discountenanced and like a chess player the grasshopper again relapsed into meditation. There was no recurrence of that behavior nor indeed of any behavior during the remainder of the period. At the end of five hours, the duties of my station interrupted the experiment.

I prepared and consumed a satisfactory meal and, ninety minutes later, returned to the observation. The specimen was still occupying the precise position in which I had left him. Taking up once more my station of the morning, I prepared to renew the investigation, but a gradual dulling of the senses ensued, followed shortly by a complete loss of consciousness. When I awoke some two hours later he had jumped. But incomplete as it was, this much can be deduced from the observation, in any situation where a good bunk is present even an insect can furnish amusement.

3. A third amusing phase of smoke-chasing is the meditation of the smoke-chaser. It is possible to point out but one or two sources of this pastime. The first is the insoluble enigma of the correct menu for the next meal. At first this problem is difficult, as the season advances it becomes increasingly so. This results from the diminishing food supply and the surfeiting appetite. There are possibilities of unlimited preoccupation in the question.

Then, second, there is the question of getting water up the hill without going down the half mile of perpendicular steep to fetch it. In the end the trip must be made. But before recourse is had too that expedient, much amusement may be had from a consideration of the possibilities of a gasoline engine and a water pump.

Labor Saving Devices

The reference here is not to the invention of machines but rather to the invention of ideas. The invention of a machine may save some labor but the right idea saves it all. A device which converts work into something that is not work saves labor. Fishing is the best method of cruising timber. Hunting is an effective means of locating new trails. Each of these activities treated alone is work. In the suggested combination each is a pleasure. The combination thus saves the labor. A labor saving device then may be defined as a scheme which reduces the effort of the worker without affecting his apparent output. By effort I mean what the smoke-chaser does, by apparent output, what the ranger thinks he does. By these definitions it is clear that the relation between effort and output will largely be determined by the smoke-chaser's report.

RECORDS

To be a labor saving device the diary of a smoke-chaser should be a code of ethics in the sense that it records what ought to have happened rather than what actually did. This end can be achieved by none but the master of phrases.

There are certain phrases that will accomplish as much as a hard day's work. Among them may be mentioned "fire-prevention", "work in camp", and "trail location". These summarize the activities in which the ranger is most interested. It requires no effort, or scarcely none, to put them in the record and their presence there assures the ranger that the output is all right. They must, hence, be regarded as great labor saving devices.

FIRE LOCATION

In the Fire-Fighters Manual there is a regulation requiring the smoke-chaser to be in progress toward the fire ten minutes after it is reported. This regulation would work a great hardship if it were not for the fact that the man who progresses likewise reports. It results from this that fires never start in the evening. It is otherwise with a beginner. For him every smoke is a fire regardless of the time when, or the place where it starts. But for the old timer no smoke is a fire unless it shows up in the morning, nor is it one then if there is the slightest chance of another one springing up in an easier place to go to. Great labor can be saved in skillful fire location.

HIKING

In spite of his inclination to the contrary a smoke-chaser will do considerable hiking in the run of a season. The great criticism of the forestry service is that when a man goes into it he must carry his own transportation facilities with him. This defect is notable in connection with smoke-chasing. Any kind of conveyance, even a prospector's donkey would greatly lighten the burden of the smoke-chaser. But even such modest provisions are lacking. Prospecting is thus a more favorable profession than is smoke-chasing. A prospector goes looking for something he wants and a donkey bears his burden. The smoke-chaser goes searching for something he doesn't want and carries a pack with him that would stagger a donkey. The smoke-chaser hikes and packs, the prospector just hikes. One finds what he is looking for about as frequently as the other. But the great point of similarity between them is in the hike.

Hiking may be divided into two classes, on a trail, and off. The first is difficult, the second is more so.

1. Hiking on a trail is difficult for one reason, because the trail itself is capricious. If it is on top of a mountain it will zig-zag down at every opportunity. If it is in a canyon it will angle up on the slightest provocation. It can be counted on, however, to go straight up over the top of the highest mountains and straight down over the roughest brakes.

The theory carried out in trail construction is that if the worst places are made accessible by trails, the best can be reached without them. But while this theory justifies their location on the worst ground it does not make the trails any the less difficult to travel. To the hardships of the trails must be added the weight of a fifty pound pack. This combination is bad but the smoke-chaser endures it mainly because the other alternative is worse.

2. Hiking where there is no trail can have but one consequence, sooner or later the hiker is lost.

In an emergency like that a compass is useless. I have frequently felt that I was lost just a little and found on consulting the compass that I was lost a whole lot. Instead of one error I was confronted with two. The sun in such cases becomes a poor mediator. If the fancy possesses it, it will set in the north with its usual complacency. When the sun shows a tendency to set in the wrong place and the needle persists in pointing due east, it is always best to make camp. Things won't right themselves over night. But if one must strike a compromise between a derelict compass and a recreant sun on the one hand and his unsupported conviction on the other it is well to begin in the early morning.

FIRE FIGHTING

A smoke-chaser is expected to handle any fire that does not cover more than an acre. But a fire of even that size can make a lot of labor. For this reason it is better to take it while it is yet very small or else wait until it gets larger.

The second alternative has several advantages. It is possible that the fire may go out while you wait, that some one from a neighboring sheep camp may put it out, or that it may get so big that a fire crew is needed. If any of these possibilities materialize, the smoke-chaser's responsibility with that fire is ended. His wisdom has saved him great labor.

But there are fires that will neither go out nor get bigger. Fifty per cent of all that start in a smoke-chaser's area will come in this class. Of this number one-half will be handled by sheep herders and freshmen smoke-chasers from contiguous territory. This will leave twenty-five per cent of the total number of fires to be managed by the resident smoke-chaser. His versatility will be taxed to overcome the labor of going to them, and the hardships involved after he gets there. In this there are devices that must not be ignored.

The labor of hiking is partly determined by the weight of the pack, consequently a reduction in weight entails a corresponding reduction in labor. But the process of reducing must not affect the quantity of the bedding or grub. The only alternative is to get rid of some tools.

Each man is expected to carry a shovel, an ax, and a grubbing hoe, a total of six tools for two men. Four of them can be dispensed with at once. One ax and one shovel will serve for both. This foresight will save the labor of carrying more than is needed and will likewise save the tools which would otherwise be thrown away.

When nearing a fire the approach should be cautious. Haste may entail the neglect of a camp site. An inferior camping place means a disappointing fire. A good camp and a bed already prepared are the best second line of defense in fire fighting. Before a single move is made toward the fire, one should cook, eat, and sleep. After that if it seems feasible he may trench in the fire. But on no account should the exertion be excessive. Many men are now concerned in making two trees grow where formerly there grew only one. But no one is concerned in salvaging the smoke-chaser when once exertion has depleted his resources. His hope, therefore, is to evade the scrap heap by avoiding the exertion. Every act should be influenced by this consideration.

This summarizes smoke-chasing from the standpoint of the chaser. It may well be guessed that if the same story was written from the standpoint of the ranger, the government, or even the public, it would have but little resemblance to this. But the angle of observation makes a very great difference. The smoke-chaser who gets lost in some other point of view when his own is now clearly defined has himself to blame for the consequences.

TWO BY TWICE

In the faraway, on a summer day
And a mountain trail would do
Just a little trail, above the vale
And wide enough for two.

Peaks tower high against the sky
The sky all clear and blue
Pine trees tall, and a water fall
And room enough for two.

A little lake at the rocky gate
And a little birch canoe,
Splashing trout, that we pull out
In the barque built just for two.

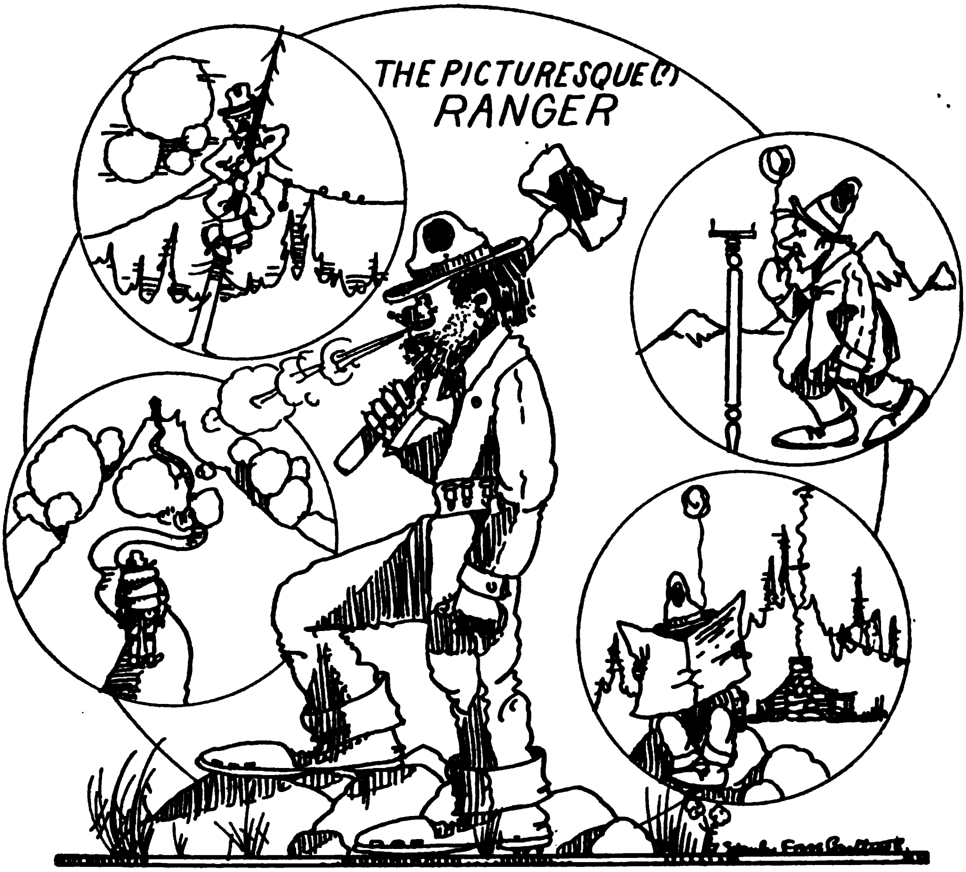
A sandy shore, ne'er touched before
We'll beach our white canoe
On the carpet brown, where cones fall down
We'll pitch our tent for two.

Birds and bear and flowers are there
And the things we love to do
We'll live to love as they do above
In the shrine meant just for two.

A little blaze to Vesta's praise
Bacon, bread and stew,
We'll live and bake for our stomach's sake
Just grub enough for two.

The moon rolls up from its crimson cup,
The sounds are clear and few.
We'll spread the coals and blanket rolls;
In dreamland—just we two.

Stanley Bartlett.



THE PICTURESQUE RANGER

By STANLEY BARTLETT.

He wasn't much on "movie" stuff,
He looked just kinder hard.
He packed a gun,
But not for fun
And held the world in disregard.

He didn't wear a great big hat
O'er his abundant hair
Or 'round his throat
A fur-lined coat,
To drown the words that he did swear.

He didn't sport a snappy suit
Of kippy forest green;
His shirt was torn
By burdens borne,
Tho' it was patched and fairly clean.

His dancing pumps were hobnailed boots
That tripped o'er miles of trail;
His cane (you'll laugh)
Was a Jacob staff;
He measured men with a Scribner scale.

When noon came around 'most any time
He grabbed a hunk of cheese,
A piece of tack
From a gunny sack
Then made his old pipe wheeze.

His literature was bulletins,
His "day of rest" reports,
He marked the pine
And fixed the line,
And played some other little sports.

From his blanket 'neath the starry sky
To dawn when birdies sang
He gave a cuss
That most shocked us
And damned the government to hang.

He's something like a hobo
And he's something like a king,
But you'll admit
That he is IT
Up on the peaks where breezes sing.

The Rangers rave about their life,
The hardships that they bear,
The awful tale
Of camp and trail
And days and weeks of work and care.

But when it comes to burdens
To sweat and cuss and grind,
They'll hit the spots
And cut 'cross lots
If they leave the student far behind.

If a guy's a forest student
The B. A.s at the "U"
Turn up their nose
At his hard boiled clothes
And the smell of his mulligan stew.
They say he smokes a big, strong pipe
And carries matches too,
Chews black snoose
And spits the juice;
Of course it can't be true.

But now, to illustrate a bit,
How much he has to do,
Without offense
I'll just commence to numerate them off
to you.
In botany he gets cross-eyed
From looking thru a glass
At cells and roots
And cactus shoots
And gooey messes in a mass.

He speaks two languages you know
The one is called profane.
The other slang
Of the forest gang
That gives the English "prof." a pain.

He knows how to "guy" a fungi,
And beat a beetle too,
Or roll a tape in decent shape,
And find a corner right and true.

If he can't scale a cat-face
Or estimate quite fair,
He'll show some "pep"
And watch his step
When he recites to Mr. Behre.

If he can't tell a slippery elm
From hickory that's tough,
I'll bet six bits
That Dr. Schmitz
Will catch him in his bluff.

If he's learning how to draft a bridge
Or how to graze a shoate,
Or how to know
Where treelets grow,
He's after Mr. Watson's goat.

Oh, these aren't half the trifles
He meets with every day,
As the awful squall
Of Mr. Fall
Who wants the world to think his way.

And when the year is finished,
And there's no more banks to rob,
He finds relief
From the strain and grief
And asks Dean Miller for a job.

THE FOREST RANGER

His throne, a lofty mountain peak,
His realm, the country 'round,
His joy, the bursting sunsets
His life, what God sends down.
His law, the law of the great out-doors,
His power a mighty force.
The trust of God and man combined
With service as its source.

Stanley Bartlett

SOME IMPORTANT FORESTRY PROBLEMS OF THE INLAND EMPIRE

By C. EDWARD BEHRE
Associate Professor of Lumbering

The enormous amount of discussion and thought which has been devoted to the need of a forest policy for the nation during the last three years has begun to bring results which represent great forward strides for forestry in this country. But encouraging as these beginnings are, the discussion and study of the past few years have emphasized the necessity of solving certain fundamental problems if progress toward real forestry practice throughout the country is to continue at anywhere near the desired rate.

One of the most far reaching effects of the recent agitation has been the stimulation of public interest in the situation. Congress, the Chamber of Commerce of the United States, and many other prominent national and regional organizations have given considerable attention to the forestry question and with a veritable flood of publicity and expression of opinion in the newspapers, periodicals, and trade journals of the country, the average citizen must certainly be much better informed and much more keenly impressed with the seriousness of the situation and the need for action than at any other period in our history. At the time Roosevelt and Pinchot were leading the fight for the establishment of the National Forests and during some of the subsequent crises, forestry held a prominent place in the public attention, but interest waned with the success of the National Forest system and now requires this new stimulation to grasp the broader problem which deals with securing a rational policy of forestry for all forest lands in the United States regardless of ownership.

Cooperation of Lumbermen

Of more direct present importance in actually producing results has been the effect of the recent movement in enlisting the interest and cooperation of timberland owners and lumbermen in all sections of the country. It seems a paradox, but nevertheless it is the truth, that within the very industries which depend upon the forests for their existence, there has been in many cases an almost total lack of knowledge of what forestry is and still less appreciation of the close relation between lumbering and forestry. Now more than ever before, however, lumbermen and timber owners are thinking about forestry, trying to get the idea of forest production linked up with their viewpoint of forest exploitation and striving with all other interests to arrive at some practical means of assuring the country of an adequate and continuous supply of timber for the future.

Lumbering is a business entirely separate from forestry and naturally enough the lumbermen, who have continually had to solve new and more complex problems in making their own industry successful, have not devoted much of their attention to forestry which seemed entirely outside their sphere of endeavor and interest. The lumber industry has been interested in the removal of logs from the forest and their manufacture at the lowest possible cost and consideration of making provision for a future crop, if thought of at all, seemed to present nothing but an increase in cost of operation without any assurance of return for the effort. As fast as markets would permit, stripping of the ground became more and more complete, on the theory that the more material which could be removed per acre the lower would be the unit cost of improvements and operation, regardless of what the actual differential in cost of handling trees of different sizes might be or of the potential value of portions of the stand for future growth. Wherever brush disposal was required by law, it was carried out with the idea of satisfying the requirements of that law at the lowest possible expense or of abating a menace to adjoining timber but without consideration of the possibility of so handling the work as to serve not only these motives but also to favor the establishment or preservation of a future crop of trees.

A year ago the U. S. Forest Service, cooperating with foresters and lumbermen throughout the country undertook a study of the measures in silviculture and protection necessary to keep forest lands in continuous production and the work and attention which have been devoted to this project have probably done more than any one other thing to

bring before the lumbermen in a concrete way what forestry required and to cause them to consider how their operations may combine the objects dictated by conditions in their industry with the measures which will prevent further devastation of forest lands and so contribute to the permanent prosperity of the country. Men who had been in the logging business all their lives, but had never given any consideration to the problems of forest reproduction, when cooperatiing in the field work with the foresters engaged in the minimum requirements project, became interested, gathered many fundamental ideas, learned that forestry and lumbering were not absolutely incompatible and acquired a viewpoint which looks beyond the present into the future of the forest industries of this country.

To secure the interest and cooperation of the forest industries in formulating for the different forest regions the measures which are necessary to prevent forest devastation and keep the lands productive has been a big step in the right direction but to make progress really effective these measures must be applied in practice. Formulation and discussion of federal and state legislation which will accomplish this has, of course, been at the bottom of all the recent forestry agitation and indeed a definite policy for the country as a whole is essential to the ultimate solution of the problem. But it is a fundamental principle of a democratic government that the government should not interfere in private industry unless the self interest of the industry or persuasion fail to fully safeguard the public interest, and experience has demonstrated that wherever the self interest of industry can be made to conform to the public interest, more satisfactory results will be obtained by private initiative than by government regulation. It is also evident that the difficulty of enforcing whatever regulations it may be necessary to formulate in federal or state legislation will increase in direct proportion to the divergence between public interest as defined in the law and self interest of the industry. That is to say that opposition will be strong and compliance merely nominal in so far as the industry feels that the requirements are contrary to its best interest, but complete cooperation will be secured just as rapidly as the industry can be shown that its interest as well as that of the public will be served by the measures required. Furthermore, progress will be made in securing the adoption of practical forestry measures without waiting for the slow machinery of government to formulate definite policies if the industries feel that these measures will not prevent the profitable conduct of their business, because interest in the forestry question has been awakened and men in the forest industries are certainly as loyal citizens as those in any other group elsewhere.

That this is true has been emphasized repeatedly in the discussions of the past few years, and that progress is actually being made is attested by the plans for forest management being made by operators in many sections of the country and by the willingness of others to try out in a thorough way the measures calculated to prevent further devastation and provide adequate regeneration. Wholesale adoption of more advanced forestry measures, however, is hindered by the presence of obstacles in the form of unsolved problems which may be grouped into four classes—taxation, valuation of cut-over lands, cost of logging large and small timber and future yield of advance growth left after logging. More definite information and assurance along these four lines would give an enormous impetus to the actual practice of fundamental forestry measures.

Taxation

Taxation of cut-over lands and young timber is probably the most serious and difficult of these problems. It is not believed that any change is desirable in the method of taxing the virgin stands, but the general property tax system as applied to growing forests is admittedly unjust and an effective barrier against progress in the practice of forestry by private parties. Students of the problem agree that the solution lies in separating the land from the timber for purposes of taxation, the land to pay a small annual tax and the timber to pay only at the time of cutting or when the value is realized. Timber owners are making some progress toward amelioration of their taxation problems by securing more equitable adjustment of the valuation of their cut-over lands with the local assessors, but final solution of this problem can only be met by legislative action in the various states. To move a state legislature, especially in a heavily timbered state where the situation is most serious, to the point of changing the basis of taxation for a certain class of property is a difficult proposition, and before it can be safely attempted, a thorough analysis of the tax situation in the state should be made in order to determine, the proportion of the total tax burden of the state borne by timber and cut-over lands under the existing

system, how rates on timber and cut-over land compare with rates on other forms of property, what the effect of further removal of timber will be upon tax rates on cut-over lands and other forms of property and how any suggested change in the tax system would affect local and state revenues, both present and future.

Valuation of Cut-over Lands

Next to the discouraging tax situation, the average lumberman is deterred from adopting measures of forestry involving an effort or expense not essential to the conduct of his business by lack of information as to the values which will attach to his cut-over lands by reason of his effort and expense to provide for a new crop of timber upon them. In very few cases is the timber owner ready to go into the business of growing timber, because of the long time element involved and therefore, aside from his interest as a citizen in conserving the resources of the country which cannot be expected to lead him to stand extra costs without hope of return, his only incentive in providing intensive protection or adopting measures of forestry will be found in the assurance that his lands will have an increased value for sale or exchange as a result of his efforts. At present he has no assurance that his efforts will be rewarded in this way for a generally accepted basis for the valuation of young growth has not yet been established and in fact the idea that forest lands stocked with young trees have any value other than that of the land itself is just beginning to gain a foothold in this country. With land exchange legislation increasing in importance as a factor in solving the country's forestry problem values for young growth of various kinds and ages will eventually be established and this difficulty will largely be removed from the path of forestry.

But progress can be made without awaiting the solution of either of these problems if forestry measures can be shown to be profitable to the lumberman either in reducing his costs of operation or in extending the life of his operation without curtailing reasonable profits at present. In order to do this, however, information is required upon the other two problems mentioned above namely, cost of logging large and small timber and future growth on cut-over lands.

Logging Cost Studies

In every stand there are some trees which, because of small size or low quality of material produced, have a stumpage value equal to zero, that is, the cost of logging and manufacturing them into saleable products equals or exceeds the sale value of the products they yield. It is a difficult matter to say just where the line can be drawn on this marginal product for our information is so meagre on the actual difference in cost of handling timber of different sizes. Most operators work on the theory that any tree which will yield a piece of lumber of merchantable size should be marketed because the greater the quantity of material secured per acre the lower will be the operating costs and the charge to be made against each thousand board feet for improvements. Even if certain of the smaller sized trees could not justify the cost of logging if they constituted any considerable portion of the stand, yet it has been argued that they should be cut if they can be marketed at all, because the improvements will have to be borne by the more valuable portion of the stand anyway and the additional cut per acre will serve to reduce the cost per thousand against the whole. Each operator, therefore, has arbitrarily drawn the line on what should constitute a merchantable tree and that there has been no certain criterion of determining whether this line was correctly drawn or not is witnessed by the fact that operators working in different sections but in timber of similar character and with operations of similar magnitude are working on entirely different standards. Only recently has any real effort been made to get actual figures which might be used to decide where the line between merchantable and unmerchantable trees should be drawn. These studies have been in progress for the last few years by the U. S. Forest Service at Missoula, Mont., and the results so far compiled indicate that in practically every stage of logging from stump to product it costs more to handle the material from the smaller trees than that from the larger ones and that in this section of the country loggers quite generally have been reducing their average net profits by removing more material from a given area than that which would return the costs of operation. It even appears that material which will yield a small margin over costs of production might better be left in the woods in many cases, because the average profit per thousand will be increased if that portion of the stand yielding the smallest margin is left behind and the gain made in this way usually more than offsets the increased charge per thousand for improvements

necessitated by the slightly lowered cut per acre served by the improvements.

In many cases the leaving of some trees of seed bearing size upon the ground is essential to the establishment of a new stand, in others the leaving of a certain amount of material near the limit of merchantable size as the basis for a second cut is the essential factor in prolonging the life of a given operation and in general the leaving of material of this character at present will, through increased growth, provide material which may serve to bridge the gap between the exhaustion of the virgin stands and the time when our needs may be fully met by new growth.

It can be seen from this that if better information upon the cost of handling large and small timber under different conditions will indicate that average profits will be increased if trees near the lower limit of merchantable size are left standing the study of this problem will be of tremendous importance in encouraging the lumbermen to leave more material on the ground and in so doing apply what in most cases will constitute some very practical forestry measures.

Growth on Cut-over Lands

Closely related to this problem and equally important in its relation to the advancement of forestry, is the fourth question of how much will material left after logging yield in the future. Conviction that maximum profits may be earned when the smaller trees are left on the ground may interest the operator in their future growth and the advisability of affording them protection and returning to harvest them in a second cut when the virgin material is exhausted. Or, without any further information upon the cost of logging the marginal product, timber owners may be ready to leave more material on the ground and protect it with the idea of making their operations continuous, if they had any reliable information upon how fast this material would grow, and how soon there would be enough to justify another cut. The average operator with timber in sight to keep his mill running twenty to forty years will consider seriously any proposition which holds the possibility of prolonging the life of his operation even a few years, for any increase in the period of operation will reduce the unit charge for depreciation upon his investment. He is not interested in the protection of cut-over lands for their own sake now because he does not see how they can return the money expended upon them, but when he can be shown how soon young growth left on cut-over lands will yield him another crop, and what kinds and sizes of material will be produced in different periods of time, he may be convinced that the practice of forestry affords him the opportunity to prolong his operation indefinitely.

Thus it can be seen that along with our efforts to arouse public interest in the forestry situation and to formulate a rational policy of forestry for the nation, we must not only seek to solve the economic problems involved but also aim to interest timberland owners in the voluntary adoption of forestry measures through studies of logging costs and growth on cut-over lands which will indicate in how far the self interest of the individual runs parallel with that of the public.

THE SCALER'S DREAM

I met a scaler old and grey
  Who told me of a dream he had.
I think 'twas New Year's Day,
  As he was snoozing in his shack
A vision came to view,
  Having seen an Angel enter
Dressed in garments white and new.
  Said the Angel, "I'm from Heaven.
St. Peter sent me down
  To bring you up to glory
And put on your golden crown."
  So the Angel and the scaler
Started up the Pearly Way.
  When passing close to Hades
The Angel whispered, "Wait!
  There's a place I want to show you.
'Tis the hottest in all hell
  Where those who always crabbed you
In fiery torments dwell."
  And behold the scaler saw there
Gyppos by the score and,
  Leaning on his scale rule,
He wished for nothing more.
  Said the Angel, "Come on scaler,
There the Golden Gates I see."
  But the scaler only murmured,
"This is Heaven enough for me."

IDAHO TIMBER SALE POLICY

By F. G. Miller, Dean

The State of Idaho controls upward of 700,000 acres of timber lands. These are part of its original land grant made by the federal government, mostly for the benefit of the educational institutions—the public schools, the normal schools and the university. This timber area will be increased by more than 100,000 acres by the recovery on the part of the state that part of its grant within the unsurveyed portions of the national forests. This will be brot about by exchanges now under way with the U. S. Forest Service. The 700,000 acres carry ten billion board feet of merchantable timber, valued at thirty million dollars.

The management of the state grants is vested by the constitution in a state land board consisting of the governor, attorney general, secretary of state, state auditor and superintendent of public instruction. The admissions bill prescribes that the proceeds from all lands granted for educational purposes shall constitute a permanent school fund, the interest only of which shall be expended in the support of said institutions. By far the greater portion of these timber lands are better suited to timber production than to any other use. If rightly handled, they will not only yield the first thirty million dollar endowment, but will keep adding to that endowment continuously.

It is to the credits of those who have been charged with the handling of Idaho's land grant that so large a proportion of the state timber wealth is still intact. In particular is credit due those officials who in recent years have worked out and adopted a definite plan of management for these timber lands, calculated to keep the non-agricultural portions in continuous forest production.

This policy is exemplified in the terms of what is known as the Big Creek Timber Sale in Bonner County, made to the Diamond Match Company in 1920. This sale, comprising one hundred and seventy-five million board feet, mostly western white pine, is the largest the state has ever made. The sale excludes white pine timber under fourteen inches, two feet from the ground and all trees of other species under twelve inches. All timber to be left shall be protected from injury during the logging operations, and as cutting progresses, the brush shall be piled and burned in such manner as not to damage the young trees left. It is particularly stipulated that no broadcast burning shall be permitted. It is also provided that certain white pine trees over 14 inches in diameter, where needed for seed trees, shall be left standing, and otherwise the sale is administered according to approved forestry regulations.

This policy is applied in all state timber sales, and in adopting it the Board of Land Commissioners has placed Idaho in the lead of all the land grant states in the scientific handling of its timber holdings.

PROGRAM

Out of bed at eight o'clock,
Wash my mug and dust my frock
Eat breakfast with some foolish talk
And hope.
Late to class at after nine
Do my quizzes up darn fine
Sling the Prof. a slippery line
And pray

Dinner, supper, books at ten
Study like the deuce and then
Write this with my fluent pen,
Oh Boy!
Thus I kill the passing day
Lost! and flying on its way
Guess I'd better hit the hay
And Sleep.

Stanley Bartlett.

WHY HARDWOODS DO NOT GROW NATURALLY IN THE WEST

By J. A. LARSEN
Priest River Forest Experiment Station

The association of men and trees dates back past the dawn of history. Many writers maintain that the prehistoric ancestors of our race lived in the forest altogether. Certain it is that as soon as the human race emerged from the forest, began to plow and sow, build cities and factories, they must have missed the magnificent trees which gave them shade, shelter, fuel, and material for weapons and tools, for they planted trees and shrubs around their habitations where none existed before.

To-day our need and desire for trees and for the forest is as strong as ever. We turn instinctively to the forest for recuperation from past work and inspiration for the new tasks. A home or farm without the graceful sweep of green, leafy crowns is a picture of grim poverty. Trees are needed to give a snug and restful effect. Trees and shrubbery increase the comfort as well as the value of property.

Unfortunately the beautiful hardwood trees which are native to the Eastern states do not grow naturally in the West. We have here only aspen, cottonwood, small birch, hawthorns, cherry and alder. On the Pacific Coast are oak and maple but limited largely to lower moist sites such as stream beds and canyons. The general absence of broadleaf trees in the West is most likely due to the difference in precipitation and temperature between the East and the West. To be sure, there are other factors which limit the distribution of trees such as soil acidity, alkalinity, soil and atmospheric moisture as well as inherent qualities in the plants themselves. Soil acidity and soil moisture or quality of the soil, can at best be of significance only within a limited area, and since it has been shown, except for areas near the sea, that atmospheric moisture varies according to the precipitation, it is only a result and as such not a controlling factor. Internal structure of leaves and stems, ability to transport much water, injuries by frost, etc., must be looked upon as direct results of the plant's environment rather than factors which control their distribution. There remains, therefore, the factors of temperature and precipitation and the variation and extremes of these worthy of consideration.

Air temperature, though it may not in all cases be a controlling factor, often limits the distribution of trees either by too short, too cold summer weather and frosts during the growing season, or by too great extremes. Experiments have shown that the leaves of trees do not become green in temperatures above 104 degrees fahrenheit and do not function below 40 degrees Fahrenheit. Unusually low temperatures may cause root killing, bark and wood splitting and killing of buds and stems of hardwood. If the growing season is too short the species which are introduced from a warmer climate bud out too early in the spring or have no time to form sufficient wood in the new stems to withstand frost injuries in the fall. If the nights are too cold throughout the summer months, one of the plant foods, sugar, which is not injured by freezing, has not had time to form before the cold weather sets in. The plant food is therefore chiefly in the form of starch which is damaged by frost.

From the standpoint of water requirement of trees it is well to note that the structure of the leaves, stems and wood of trees may render some entirely unsuitable for certain climates, especially in regions characterized by dry summer air and low rainfall. Deciduous trees are able to transport much more water than conifers. Dr. Franz R. von Hohnel of the Austrian Forest Experiment Station determined by careful tests over a period of 12 years that one acre of oak forest lost by transpiration from 2,227 to 2,672 gallons of water per day during periods of growth. This is equal to 2.9—3.9 inches of rainfall per month for the growing season—much more than occurs over the western sections of the United States. Other broadleaved trees are much like oak in respect to evaporation of water.

An examination of the distribution of hardwoods in the Eastern states shows that

their general northern limit follows a line through St. Paul, Minn. to Eau Claire and Sheboygan, Wis., Grand Rapids, Lansing and Detroit, Mich. North of this line the forest is predominantly coniferous. From Detroit to central New York an inversion occurs in that the hardwoods are on the north and the conifers to the south. This is evidently due to low land and relatively warm air surrounding the lakes and the higher land with colder air to the south. From central New York the line goes northeast through western Massachusetts, through Concord. N. H. and Augusta, Me. with conifers on the north and hardwoods to the south. The westward extension of the hardwoods is defined by the Mississippi River from St. Paul to Rock Island, Iowa, thence southeastward through Iowa, Kansas and Oklahoma, irregularly, according to local variations in topography.

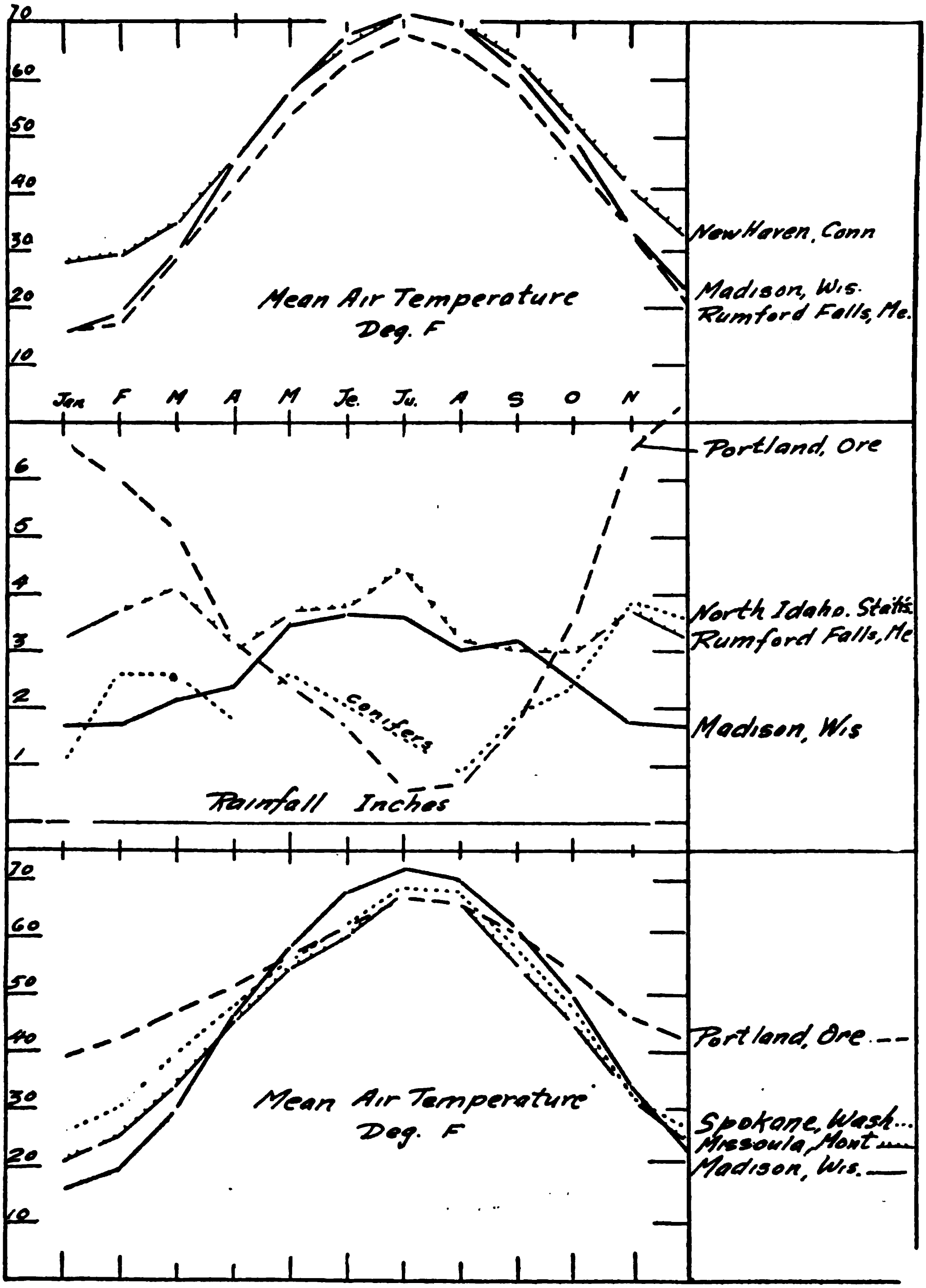
A study of the weather data for stations in the coniferous and the hardwood belts, published by the U. S. Weather Bureau, shows no sufficient differences either in the total, annual, or the monthly distribution of rainfall, or in the amount of snowfall, to produce these results. One would naturally expect to find a greater rainfall in the hardwood area but the opposite is often the case. The precipitation for Rumford Falls, Me., and Portland, Me., are both close to forty inches. The first is within the coniferous forest and the second is known for its Waverly oaks. Keene, N. H., is chiefly coniferous and has an annual precipitation of 40.4 inches, while New Haven, Conn., within the hardwood belt, receives 47 inches. Similar comparisons for more western stations in the two distinct forest belts lead to the conclusion that precipitation is not the deciding factor in restricting the northward extension of deciduous trees.

Low precipitation, however, appears to prevent the westward extension of hardwoods and conifers alike in Minnesota and Iowa, and it seems that the hardwood forests in Minnesota require at least 28 inches of annual precipitation, regardless of the monthly distribution. Madison, Wis., and Davenport, Ia., both in the hardwood type, show respectively 31.9 and 32.9 inches annual precipitation. St. Paul, Minn., on the borderline between hardwood forest and prairie, has 28.6 inches and Sioux City, beyond the natural westward extension of forests on uplands, only 25.5 inches. This last amount seems therefore to impose the limitation in that region.

In respect to air temperature, it is found that at Rumford Falls, Me., Crookston, Minn., Cooperstown, N. Y., etc., places within the coniferous belt, or at least more coniferous than deciduous, the mean annual air temperature is not above 45 deg. F., and for July and August it does not exceed 68 or 69 deg. F. In the hardwood belt the annual temperature is everywhere above this. Portland, Me., and Madison, Wis., show 46 deg. F., New Haven, Conn., 50 deg. F., and in July and August the mean air temperature for these places goes above 69 deg. F. Another very significant difference is found in the longer frostless seasons in the hardwood than the coniferous belt. In all cases, data for stations in the hardwood forest belt show absence of frost in May, June, July, August and September, while stations in the coniferous belt show frequent killing frosts in May and September. From this it appears that a low air temperature and prevalence of frosts in late spring and early fall, rather than differences in precipitation, are restricting the northward extension of hardwoods in the eastern United States. (See following table for differences in length of frostless season for hardwoods and conifers, and for stations in the West).

Average Date of Last Killing Frost in Spring and First Killing Frost in Fall
(Bulletin Q, U. S. Weather Bureau)

	Spring	Fall
Hardwood Region		
Portland, Me.	April 14	Oct. 18
New Haven, Conn.	April 20	Oct. 17
Detroit, Mich.	April 28	Oct. 9
Madison, Wisc.	April 21	Oct. 17
St. Paul, Minn.	May 6	Oct. 6
Coniferous Region		
Rumford Falls, Me.	May 15	Sept. 20
Keene, N. H.	May 16	Sept. 10
Cooperstown, N. Y.	May 7	Oct. 1
Crookston, Minn.	May 19	Sept. 18
Western Stations		
Helena, Mont.	May 11	Sept. 24
Missoula, Mont.	May 30	Sept. 5
Spokane, Wash.	March 21	Oct. 12
Portland, Ore.	March 17	Nov. 16
Pocatello, Idaho.	April 10	Oct. 11
Boise, Idaho .	May 3	Oct. 24
Baker, Ore.	June 1	Sept. 26
Moscow, Idaho.	May 10	Oct. 2



Climatic records over the Great Plains' section of Wyoming and Montana show insufficient precipitation for trees of any kind. As is well known the conifers grow mostly at higher elevations, and cottonwoods and willows along the streams. The annual precipitation at Miles City is less than 14 inches, and that for Helena and Great Falls, closer to the Rocky Mountains, only 15 inches. However, the air temperature curves for the low Mon-

tana and Wyoming Great Plains' stations, and the presence of the more hardy broadleaf trees, indicate that these can be raised there provided sufficient water is supplied. At stations above 4500 feet elevation, and at the more northern points such as Great Falls and Havre, the severe spring and fall frosts, very low winter temperatures and short growing seasons, would aside from insufficient moisture, impose very effective barries to most hardwood species.

In the Flathead and Bitterroot valleys, at elevations around 3000 feet and slightly under the influence which the Pacific Ocean exerts over the climate of the Northwest, air temperatures are more moderate than in central or eastern Montana, but precipitation is much deficient and broadleaf trees cannot be raised without watering.

Points to the west of the Bitterroot Range at elevations of 1500 to 3000 feet show even warmer atmospheric conditions and less frost than the Montana stations. The same holds for the central and southern Idaho stations such as Boise and Pocatello, and in this region temperature conditions are not unsuitable for hardwoods. The precipitation, however, is undoubtedly insufficient. Spokane receives only 18 inches, Moscow, one of the most favorable in this respect, receives 25 to 27 inches; Burke and Murray, which lie above 4000 feet elevation, have as much as 40 inches. There are no hardwoods growing naturally in this region. The reason is unquestionably due to the very low summer rainfall, the accompanying low humidity and the drying winds from the Snake River desert region. This climatic condition is explained by the fact that the northwestern states partake of the Pacific Coast type of precipitation which shows a high winter and low summer rainfall, and because much moisture is taken out of the westerly winds by the Cascade Range.

On the Pacific Coast the air temperatures, except for the higher elevations, appear very favorable for hardwoods. This belt is so close to the ocean that even though the summer rainfall is in most places lower than in the Inland Empire the relative humidity in summer is greater. Portland shows a relative humidity of 45 per cent in July and August, and Spokane only 25 per cent. In spite of this fact hardwoods are not found generally on the Pacific Coast. It is interesting, however, to note that many eastern hardwoods in Portland and other owns in the Willamette Valley in Oregon show excellent growth and development, among these maple, elm, chestnut, black walnut and tulip. This is evidently in a large measure due to the favorable temperature and absence of frost during the growing season, the moist air from the ocean, prevention of loss of soil moisture by the pavements and additions of water by sprinkling and water from washing of the streets.

The comparison of climatic conditions for eastern and western United States shows that for most of the cities and farming areas in the West the air temperature is favorable for hardwoods, but the precipitation and air moisture, and therefore soil moisture, are deficient for these trees. Fortunately the experiments with shade trees prove that this deficit in rainfall may be made up to a large extent by watering. Most of the towns of this region already show a pleasing variety of deciduous shade trees, particularly Norway and red maple, white and cork elm, black locust, European birch, hackberry, honey locust and some red and black oaks. Towns with more favorable air temperature, such as Boise, Salt Lake and Ogden, boast of walnut, chestnut, linden, sycamore, osage orange and white oak. Missoula, Montana, has European birch, Norway and red maple, black locust, white elm and cork elm, green ash, American linden, several oaks, and one somewhat stunted chestnut. Spokane, Coeur d'Alene and Sandpoint have a greater variety. The last two cities have less frost in May and September than the surrounding country because of the influence of the lakes. It is necessary, however, to water the trees abundantly, for wherever the owners moved and left the trees unwatered. the trees died. Even in spite of heavy watering certain trees die during unusually dry summers.

Experiments with a great many varieties of eastern hardwoods at Priest River Forest Experiment Station on logged white pine land in northern Idaho are of interest also in this connection. The plants are set out from 1912 to 1914. The air temperature is on the whole lower in summer than within the hardwood region in the East, and the summer rainfall and relative humidity very much lower. Frosts have occurred every month during the summer and the growing season is very short. While a great many species, have been proved too sensitive for planting within the white pine

region in Idaho the results with the following indicate that they will grow within the yellow pine forest region or on warmer sites provided they are watered; red maple, white ash, red oak, white elm, black cherry, hazel, boxelder, European birch and Chinese elm. It is in all cases necessary to protect the young trees from heavy sod competition, gophers and cattle.

Success without irrigation has been obtained with the following species by the University of Idaho forest school at Moscow, Idaho:

Norway maple, sugar maple, sycamore maple, silver maple, black locust, white elm, white ash, yellow birch, black walnut, red oak, burr oak, and box elder.

The plantations at Moscow, Idaho, which were begun by Dr. C. H. Shattuck in 1911, are on the north side of one of the typical Palouse hills. The elevation is 2569 feet, the annual precipitation 23 to 27 inches, with less than two inches for July and August combined. The frostless season is May 10 to October 2 and the average annual air temperature, 46 deg. F. Professor F. W. Gail has found that there is a remarkable difference in climatic conditions on the exposed and the sheltered sides of these hills. Measurements show that the wind movement on the southwest aspect in July and August was 27 miles per hour, and on the northeast aspect only one mile per hour. Consequently the reduced transpiration and lesser loss of water from the leaves of the trees on the northeast than on the southwest aspect must be a great help in the establishment and growth of eastern hardwoods.

In conclusion it may be said that precipitation and atmospheric moisture over the western United States are insufficient for the eastern hardwoods. Air temperature is suitable in most towns and cities and over extensive farming sections. This makes it possible by irrigation or by planting in certain very favorable sites such as moist slopes and aspects sheltered from the driving summer winds, to raise eastern hardwoods in the Pacific Northwest. Except for southern Idaho and the Pacific Coast cities, however, the frequent frost which occurs over most of the region during late spring and early fall are a serious drawback which stunts and kills back the young trees and retards growth on the mature trees.

FOREST PROTECTION WEEK

By proclamation of President Harding and of Governor Davis of Idaho, the week of April 16-22 was designated as Forest Protection Week and through the work of a special committee appointed by the Western Forestry and Conservation Association for Idaho, cooperating with the U. S. Forest Service, no opportunity was lost of bringing home to every class of people in the state the importance of public support in forest fire prevention and individual responsibility in seeing that no fires originate through carelessness.

A program for use in the schools of the state which consisted of a series of short papers dealing with various phases of forest protection was prepared and printed through the generosity of the North Idaho Forestry Association with each article on a separate sheet to facilitate the assignment of readings to the students taking part in the program. Twenty-five hundred of these programs were placed in the hands of school teachers, ministers and Boy Scout masters throughout the state. In addition to this, a circular letter pointing out the importance of the forests to the people of Idaho and asking for cooperation in making fire prevention a success was sent to 64 Chambers of Commerce, 12 Rotary Clubs, 104 American Legion Posts, 13 Elks Clubs, 38 Farm Bureaus, 103 Federated Women's Clubs, 22 Labor leaders and 3 chapters of the National League of Women Voters in the state.

Short addresses were made in every important town by members of the U. S. Forest Service or others before civic and social organizations of various kinds. The newspapers of the state were supplied with specially prepared feature stories and in many towns attractive window displays featuring fire prevention and fire fighting work were shown by the merchants.

Dean F. G. Miller served as chairman of the committee for Idaho with W. D. Humiston and Harry C. Shellworth as subcommittee on Advertising; C. K. McHarg and F. S. Baker as subcommittee on press; Henry Schmitz, Miss Ethel Redfield and C. W. Watson as subcommittee on school program and C. E. Behre and Ben E. Bush as subcommittee on speakers.

THE SCHOOL OF FORESTRY IN 1921-22

By F. G. MILLER, Dean

It is gratifying to record another successful year for the School of Forestry—a year not only of continued growth in numbers, but one of the increasing activities looking toward the betterment of forest conditions in Idaho. The past summer gave an opportunity to make a number of needed improvements about the School. A large, well lighted laboratory was especially fitted up for the classes in drafting and mapping and considerable new equipment for field and class-room instruction has been provided in the course of the year.

Dendrology Laboratory Class

New Instructor

The teaching force has been greatly strengthened by the coming of Clarence W. Watson to take charge of the work in silviculture and grazing. These are both very important fields in Idaho, and Mr. Watson is unusually qualified to develop them. After taking the degree of Bachelor of Philosophy from Yale University in 1916, he spent sixteen months in war service with the Engineers in France, and on the signing of the Armistice was given a government detail for further study in Paris. Returning to the United States, Mr. Watson reentered Yale University and graduated from the School of Forestry in 1920, with the Degree of Master of Forestry. The year of 1920-21 he studied forestry in Sweden on a scholarship award from the American-Scandinavian Scholarship Exchange, specializing in forest management and silviculture.

Enrollment

The resident enrollment in the School of Forestry for the year has reached a net total of 75. Of this number, 3 are registered as graduate students, 41 in the full four year courses, 21 are unclassified, and 10 enrolled in the ranger course. To the above there should be added 27 students who are carrying forestry courses by correspondence, making 102 students in forestry for the year. The cosmopolitan character of the School is shown in the fact that these 102 students come from 24 different states and India.

The coming to us of Mr. P. D. Sharma and Mr. D. S. Man all the way from India to complete their training in forestry is especially gratifying. Mr. Sharma is a graduate from the Imperial Forest College at Dehra Dun,

India, and is a candidate for the degree of Master of Science in Forestry. Mr. Man is registered as a freshman.

The correspondence from prospective students is the largest it has ever been, thus giving every promise of a still larger enrollment the coming year.

Change in the Ranger Course

Beginning the coming year, the Ranger Course which has been announced as a two year course of five months each, will be given as a one year course of eight months. Altho this is a slight reduction over the former course in point of time, the work has been so planned as to include all the essential subjects. The work will be given in three terms, and the second or winter term will be offered as a Special Twelve Weeks' Course, designed for those who cannot come for a longer time.

New Correspondence Course

The School has announced the past year correspondence courses in "Our Trees and How to Know Them", and "Forest Economics". The correspondence course in "Lumber and Its Uses", first announced four years ago, continues to enjoy a goodly registration. About 175 men have enrolled for the course to date.

Investigations

The School of Forestry has had several important investigative problems under way during the year, altho incident to the rapid growth of the School the teaching load on the forest faculty has been heavy. New impetus was given the research program when a year ago the Board of Education, on the recommendation of Commissioner Bryan and President Upham voted to put the members of the staff on a year long basis, with a view to allowing them their summers for forest investigations. This is a wise policy and is enabling the School to render the state a much greater service than would otherwise be possible. It is recognized, however, that the training of young men for the forestry profession is the chief function of the School and this fact is taken into account in all its plans.

The School, throughout the year, has been in cooperation with the U. S. Forest Service in a study of the public requirements for keeping the potential forest lands of Idaho in a state of continuous forest production. This is part of a nation wide study inaugurated a year ago by the U. S. Forester, Col. W. B. Greeley.

As mapped out by the Forest Service, the study in Idaho involves two districts—the white pine region of the north and the yellow pine region in the south. The study of the white pine belt was made by Mr. W. C.

Class in Log Scaling in the Field

Lowdermilk of the Forest Service and Dean Miller, both spending the entire summer in a field investigation extending from the Clearwater country to the Canadian border. In the course of the fall and winter, a number of conferences were held with the timber operators and an agreement reached on the measures essential to continuous forest growth, tho entirely without reference to their practicability.

The study of the yellow pine region was made by Prof. C. Edward Behre in cooperation with Mr. R. H. Weidman of the Forest Service and their report now in preparation is likewise based on exhaustive field investigation and numerous consultations with operators and their representatives.

Research problems under way or completed the past year by Dr. Henry Schmitz, in charge of forest products laboratory are as follows:

1. Studies in wood decay III. The Availability of Western Yellow Pine Crude Oil as a Wood Preservative. To appear in the near future in the Journal of Industrial and Engineering Chemistry.

2. Studies in wood decay IV. The Toxicity of Pyridine and Quinoline to Wood Destroying Fungi with Special Reference to the Availability of Shale Oils as a Wood Preservative. Preliminary experiments completed.

3. Studies in Wood Decay V. The Effects of Sodium Chloride, Sodium Sulphate and Sodium Nitrate on the Rate of Decay of Wood Induced by Wood Destroying Fungi with Special Reference to the Rate of Decay of Wood in "alkali" soils. Almost ready for publication.

4. Note concerning the decay of western yellow pine slash induced by Polyporus volvatus Peck. Ready for publication.

Under the direction of Dr. Schmitz, Mr. P. D. Sharma has prepared and submitted for publication an interesting paper, on "The Maule Reaction as a means of Distinguishing Between the Wood of Angiosperms and Gymnosperms." Mr. Sharma also has in preparation a paper on "Studies in Wood Decay VI, The Relative Durability of Slash and Vertical Grain Lumber."

The stem form studies of western yellow pine originated, under the direction of Prof. C. E. Behre, by J. P. Drissen last year have been continued this year by J. W. Farrell and expanded to cover western white pine by J. P. Drissen. The work done last year showed that the second growth yellow pine in this region conforms very closely in stem form to the theoretical form indicated by Jonson's form quotient and taper series as used in Sweden. Farrell's work this year has been along two lines. The first aimed to determine the range of form classes represented in a given stand and the feasibility of using the form class of average trees as the average form class for a stand. The second studied the relation between actual form class measured outside bark and "normal" form class inside bark when graphical correction of the actual taper has been made to eliminate stump flare. Compilation has not yet been completed so that no conclusions can be drawn at this time. J. P. Drissen, who spent several months during the year doing graduate work at the school has worked over a large number of Idaho white pine analysis sheets and put them in shape for comparing their percentic taper with Jonson's theoretical taper series.

In addition to these studies in stem form, another project which may utilize the results of the first has been initiated by Ivan Melick under the direction of Professor Behre. Preliminary work has been done on the compilation of a yield table for second growth yellow-pine and several sample areas have already been measured.

W. Byron Miller, under Mr. Watson's directions, has completed a meritorious paper on range reconnaissance methods, based on personal observations and field work covering two seasons.

Summer Work

Nearly all of the student body and all of the faculty will again be employed in the field the coming summer months. The majority of the students have accepted jobs with the U. S. Forest Service and will be scattered throughout the states of the northwest; several will take work in the saw mills and logging camps, and a few will remain at the University for the summer session.

Of the faculty, Dr. Schmitz will have charge of a white pine blister rust survey with a party of six men under him. Mr. Watson will be associated with the U. S. Forest Service in grazing reconnaissance studies in Montana, while Prof. Behre and Dean Miller will be engaged in field studies within the state.

Associated Foresters, University of Idaho, 1922

THE ASSOCIATED FORESTERS

With new officers installed at the commencement of school last fall, the Associated Foresters of the University of Idaho completed another successful year in their history. The club officers for the year were: President, Herman Baumann, '23, Milwaukee, Wisconsin; Vice-President, Jack Rodner, '23, Moscow; and Secretary-Treasurer, G. W. Madlinger, '24 Poughkeepsie, New York.

The meetings were held in the evenings of the first and third Wednesdays of the month. This plan of holding evening meetings was very successful and enabled the club to combine pleasure with business. At the close of each meeting, it was customery to have the regular lunch, consisting generally of "hot dog" sandwiches, coffee and doughnuts.

The annual dance and banquet were the main functions of the year. These are described in some detail elsewhere. Then, at the time the proposed transfer of the U. S. Forest Service to the Department of Interior was much debated in Forestry circles, the Club met and as a body of coming Foresters, passed a resolution condemning this change. Copies of this resolution were forwarded to each of the Senators and Representatives of the State at Washington, D. C. Today, the Forest Service is where it rightly belongs, and may our hopes be that it remains there forever.

Later in the year, a five-real moving picture film, picturing the destructiveness of the white pine blister rust disease, was secured from the Department of Agriculture and shown at a special meeting which was opened to the entire university.

Work, cooperation and attendance are the essence of any organization, and these alone made it possible for the Club to enjoy a successful year.

The following calendar of the club's meetings gives the speakers and the subjects of their addresses:

October 26. Dean Miller gave a short talk to the club and urged a better scholarship over the good record made last year. Prof. Schmitz gave a welcome address to the freshman class and new members. Mr. Watson spoke on the true significance of the Forest Club.

Nov. 2. Dean Miller addressed the club on "The Twelfth Session of the Pacific Coast Logging Congress at San Francisco".

Nov. 16. Mr. W. C. Lowdermilk, Forest Examiner of Missoula, Montana, addressed the club on "European Forestry Methods".

Nov. 30. J. W. Farrell, '22, spoke on Xi Sigma Pi, the national honorary forester's fraternity, its ori in and merits.

Jan. 16-21. District Forest Inspector G. B. Mains of Emmett, Idaho, gave a series of lectures on "Management of Yellow Pine".

Jan. 23-28. Forest Examiner J. A. Larsen of Missoula, Montana, gave a series of lectures on "Silviculture".

February 13-18. Forest Examiner W. C. Lowdermilk of Missoula, Montana, gave a series of lectures on "Management of Western White Pine".

Feb. 27-March 4. Forest Examiner H. R. Flint of Missoula, Montana, gave a series of lectures on "Protection of Forests from Fire".

Feb. 23. Russel Cunningham, a graduate of the School of Forestry and now with the Forest Service, spoke on "The Week's Law".

A BIT O' THOT

I'm wond'ring tonight as I sit all alone
At a seemingly endless, hard task
If the petty awards of money and fame
Are worth the huge prices they ask.

I'm wond'ring if God, who sees all these things
Really planned for us mortals this strife,
Or if it's a crime to waste our short time
In molding a cold, worldly life.

When I see the old sun slowly sinking
In the mountain tops gay bedecked fold,
I know why God, the Creator,
Didn't make it to be bought and sold.

Why He didn't place a price on true love,
Or auction good friends on the block
Or fashion the earth in silver and gold
Instead of dust, mud and rock.

The sea could have been of sweet nectar.
The clean air of incense might be
And he didn't plant a column of marble
In place of a ragged, green tree.

So, why should this mortal-made money
Bring burdens that we cannot lift
And cause us to struggle and sorrow
When God-given things are just gifts?

Stanley Bartlett.

IDAHO FORESTERS BANQUET

The sixth annual banquet of the Associated Foresters of the University of Idaho, held January 19, was in every respect a pleasing event, reflecting credit upon Dean F. G. Miller and the committee on arrangements. The tables were set in the form of an "I" and were decorated with miniature evergreen trees, while the ball was lighted with green candles, one for each plate, set in pieces of wood representing sections from saw logs. Music during the evening was generously furnished by the "Jazz Four" from the university. The guests, Dean Miller and the toastmaster occupied seats at one end of the group of tables. Prof. C. W. Watson made a most efficient toastmaster, appropriate and in some cases most amusing comment accompanying his introduction of each speaker.

Dean J. G. Eldridge, head of the department of modern languages of the university, was the first speaker. He gave a clever impersonation of the poet, Vachel Lindsay, much to the amusement of his hearers, and then told some interesting history of the department of forestry, which was established at the University in 1909.

Ex-governor W. J. McConnell, who is perhaps more closely identified with the early history of Idaho than any other man now living, spoke on "Pioneer Days in Idaho." Despite his 82 years, he is a ready talker, and his tales of the early history of the state and of Moscow, always interesting, were especially so to the young men, many of whom are from other states and know littlo of the early days of Idaho.

Herman Baumann, president of the Associated Foresters, spoke on "Our Forest Club", telling entertainingly of the purposes and work of the club, and Paul Bieler, a member of the Ranger Course, delighted the audience with a solo on the ocherina.

Brown M. Schick, editor of the Moscow "Star Mirror", spoke on "Publicity as a Factor in the Promotion of Forestry", urging that the advantages of the excellent School of Forestry of the University of Idaho be carried to the world through the press.

P. D. Sharma, a native of India, who came many thousands of miles to take advanced work in forestry at the university of Idaho, interested his audience with his story of the life and work of "A Forest Ranger in India." Those present were given a vivid description of the work of the ranger in that distant land.

Ben E. Bush, assistant state land commissioner, told of the "State Forest Policy", referring to the various interests concerned and stating that the state of Idaho was enforcing the piling and burning of all brush left after logging on sales of state timber.

S. F. Bartlett, a young student in the forestry department, captured his audience with an original poem and responded to two encores with other poems of his own writing.

Representative Lloyd A. Fenn, of Kooskia,

a graduate from the forestry department in 1911 and now engaged in the practice of law and the operation of a newspaper, spoke on the "Proposed Transfer of the U. S. Forest Service to the Department of the Interior", pointing out in a most convincing manner the danger of such a move and giving much interesting data on the establishment of the Forest Service and the work which has been accomplished for the conservat'on of the nations' forest resources.

C. R. Patrie, an alumnus of the State Forest School, interested those present with a description of the proposed "President's Forest in Arizona".

The evening's program was brought to a close with a talk by G. B. Mains of Emmett, District Forest Inspector of the Payette National Forest on "Forest Reminiscences". His talk was replete with interesting happenings and many men well known in Idaho's history were mentioned.

The sixth annual dance of the Associated Foresters, known on the campus as the "Timberbeast Hoedown", took place in the University gymnasium, on December 3. Through long association with the elite of the campus, ye Timberbeast has acquired a stately taste for the latest in fashions. Hence, no "Timberbeast" was marked in the throng of dancers, due only to the absence of the conspicuous and conventional "Timberbeast" garb. Nevertheless, the "Timberbeast" aggregation was well represented, as was signified by the unique paper caps worn during the Foresters' special dance.

Long before the dance, a raid was made on Moscow mountains and several loads of evergreen saplings were brought home, which helped to transform the cold and bare walls of the gym into a miniature forest. The art of camouflaging the gym was in itself unique. In the center of the floor, a small grove of fir trees hid the orchestra. From above the grove. long evergreen streamers radiated in all directions to the balcony above and from there dropped to the floor again. The entrance to the hall was decorated, but above all, the lighting effect was wonderful—ask those who attended, especially the fair "Co-eds".

The programs were unique in themselves and made a handsome everlasting memory of one of the best dances of the year. A crosscut saw was selected for the cover design, and for four hours the orchestra "sawed" out some wonderful syncopated jazz music. The dance was a complete success from every standpoint, as was evidenced by the good spirit which prevailed everywhere.

PROTECTION OF THE FORESTS FROM FIRE

By JACK RODNER, '23

One of the most vital needs in Forestry today is a strong, uniform protective policy. Fire protection to the average person means little or nothing and withall this in itself is quite natural. Even in the most disastrous years with the timber losses mounting into staggering figures, the most powerful weapon of all, public opinion, still lies dormant. Large sums have been expended annually in an effort to educate people along those lines but to date these efforts have produced little in tangible results. Cancellaion stamps on envelopes, glaring multi-hued posters and Forest Protection Week have served their purpose well but there still remains much to be done. There is no attempt here to be critical about the attitude of the public only insofar as it has not thoroughly understood the gravity of the situation.

A few pertinent facts in the form of statistics will show these statements to be absolutely true. For convenience, we may separate. the losses into those sustained by the National Forests and those sustained by private timber owners. From the most accurate data available, we find the average annual losses throughout the United States during a period of five years (1916-20) to be as follows:

No. of fires reported 32,517
Area burned over ....7,560,000 acres
Property loss $17,240,000

If we stop to consider that this is probably a fair average for any corresponding five year period, the total is sufficiently large to startle even the layman. Another interesting group of statistics is found in the losses sustained in our National Forests during a four year period.

Year	1917	1918	1919	1920
Total No. of Fires	7,814	5,573	6,800	6,078
Area Burned, Acres	962,543	694,651	2,007,034	342,193
Tot. Cost, Fire Fighting	$1,121,451	$714,009	$3,039,615	$1,000,000
Estimated Damage	$1,353,627	$688,332	$4,919,769	$419,897

The foregoing figures have placed before us a conservative idea of the fire losses both in the nation at large and in our national forests. In order that we may gain a more comprehensive idea of the situation, let us take for example a state such as Oregon. The following figures are taken from the report of the Oregon State board of Forestry for the years between 1911 and 1916. The average annual losses amounted to $119,245, while the acreage burned over was 16,250. It is only fair to state however that for a preceding period during which there were no protective measures, the fire losses were far in excess of those of the present time. During a three year period (1908-1910) in which there was no fire protective system, Oregon suffered an average annual fire loss of $663,935. A comparison between these figures certainly justifies the existence of the present system even though it is far from perfect.

A question that arises, or at least that should arise, in connection with any public expenditure is whether such an expenditure is justifiable. In the case of protection expenditures, the answer is yes. In support of such a positive statement, we have a myriad of hard cold facts basd on sound economic principles. What damage does a forest fire really do? How sweeping and far reaching are its effects? The answers to these questions may be classified under eight main heads:

1. Injury to trees containing merchantable material.
2. Injury to young growth including reproduction.
3. Injury to the soil (Physical rather than chemical in nature).
4. Injury to the productive power of the forest.
5. Injury to the forage.
6. Injury to the stream flow and industry.
7. Injury to property.
8. Injury to human life.

It is impossible here to explain fully each of the points mentioned, but a few words will sufficiently emphasize their importance. Injury sustained by merchantable timber in a fire is plainly evident. Such an investment or possession has a cash equivalent and its destruction therefore means the same in dollars and cents, as any financial loss. Injury to young growth, on the other hand does not represent an investment upon which there is an

immediate return. Such an investment will have a cash valuation only when the young growth reaches merchantable size. The destruction of reproduction places the non-agricultural lands on a nonproductive basis and makes them a liability rather than an asset. Vast and practically denuded areas bear mute testimony as to the destructiveness of repeated and intense ground fires. Weathering and erosion follow closely upon the destruction of the soil cover. Ordinarily in a few short years after a destructive fire an area becomes permanent waste land with only slight possibility of further production.

The value of our forage crops in relation to the live stock industry can hardly be overestimated. A brief synopsis from the report of the U. S. Forester will serve to illustrate the value of the forest as range land. In the year 1921, which is a good average, there were issued on the National Forest alone 31,560 permits for cattle and horses and 6,500 for sheep and goats. More than 2,000,000 cattle, 79,000 horses, 3,000 swine, 7,400,000 sheep and 43,000 goats were grazed on the forests that year.

The relation of the forest to industry and stream flow is a subject which, up to a short time ago, had received little or no consideration. A timely or possibly one should say a tardy effort is now being made to prevent the destruction of timber on the important watersheds and to protect the heads of navigable streams. The industries that depend upon water power must have a constant and uniform stream flow. In order to obtain this, there must be sufficient ground cover to prevent rapid run off. A properly managed and well protected forest upon the head waters of such streams is the solution, rather than merely a solution of the problem because forests more than any other type of cover hold back flood waters, and preserve the uniformity of stream flow throughout the year. Dredging operations on many of our well known rivers, to a great extent might have been avoided if the proper attention had been paid to safeguarding the soil from erosion.

Last but not least is the tremendous property loss which accompanies each of the bad fire years and to this might be added the none too insignificant loss of human life. There are many points that might be considered under the head of direct and indirect results of fire; here we have only attempted to enumerate the main points.

It is hard, if not impossible, to make a direct statement as to the efficiency of the present protective system. It is undoubtedly true that the Forest Service officials are handicapped by lack of funds, but despite this, splendid work has been done along the lines of forest protection . Along parallel lines, we find the private timber owners, who, practically without exception have shown a readiness to cooperate with the Federal and State governments in protecting our standing timber.

A question which is by no means settled is the question of who shall carry on the work of protection. The entire question hinges directly upon what agency is best fitted to carry on this work. Some people say the U. S. Forest Service, some the various states, and some advocate the present system of division of responsibility between federal and state governments and private owners. Whatever the answer is, it should have immedate consideration and a rapid solution. One thing is certain, there should be a universal fire law adaptable to the needs of local conditions.

It is certain that in any protection program the nation must take part of the responsibility, but the timbered states are much more vitally affected than the non-timbered states. Therefore, their burden of the cost should be proportionately heavier. There is one outstanding advantage in state control, and that is the fact that it would bring home to the people living within the borders of the states in question a greater feeling of responsibility regarding our forests.

Any sound protective policy should be based first upon sound laws capable of being enforced and second upon provisions for adequately enforcing such laws. Such a statement sounds simple and it is, so simple in fact that it has proven itself to be one of the most serious stumbling blocks in protective work, whether private or national. To say just what is lacking, or what means should be taken to make a practicable working system is extremely difficult, but without reservations it can be said that if such a system could be determined and inaugurated it would solve a multitude of perplexing problems.

LEAVES FROM THE DIARY OF AN AMERICAN FORESTER IN CENTRAL SWEDEN

By C. W. WATSON
Instructor in Forestry

February 5, 1921.

How good it seems to be at the journey's end once more! It will not be for long. I shall soon be on the move again and the next trip will take me close to the Arctic circle, the country of deep snows and low temperatures, but here comes the maid with some coffee, so good-bye thoughts of the cold!

I left the forest at Alkwettern this morning to come here to Fredriksberg. The total distance is only one hundred and fifty miles but it took over twelve hours to travel it. I had to ride thirty miles through the woods in a sleigh to the railroad and it was a beautiful trip. The snow was about three feet deep and the temperature so low that the cold pierced even the wolf skin coat. The driver was an old soldier with a keen glass eye in place of one which he had lost in an old engagement. He was disposed to be talkative but occasional fits of silence gave ample time to look about at the country. For a while we would pass through sombre stands of pine and spruce, some of which were bent low by the snow, and then we might leave the road to glide out upon the ice of a serpentine lake. The ice on these lakes freezes so thick that they are used to haul logs on until the last of April. We followed the lakes for miles, crossing a little isthmus now and then to go from one to the other. Occasionally we met a sled with a load of saw logs, driving to some convenient place to dump them. Here and there along the shores could be seen large areas where the logs had been brought from the woods and laid on the ice to await the moment when the ice would go out with the spring thaw. Then booms would be thrown about them and floated to the mill.

We traveled thus from five o'clock in the morning and eleven o'clock saw us at the railroad station. The train soon came and a few minutes later the driver and his sleigh were dissappearing around a bend in the road. This line is standard gauge and quite comfortable but at one o'clock I changed to a miserable little narrow gauge road, operated by the company which owns this forest about Fredriksberg. The miniature train was due at this village about five p. m. It was a dreary prospect of four hours to be patiently endured.

Nine people occupied the compartment and it was warm and comfortable. Most of these travelers were woodsmen, husky fellows, young and lively. One played melancholy folk songs on an asthmatic accordion. Through a half-opened window I caught fitful glimpses of deep snow drifts and silent woods but the sun set early and sudden darknes enveloped us. Occasional bursts of music, sandwiched between periods of conversation, made the trip more interesting than I had anticipated and at last, about five o'clock in the evening, the little train wheezed into Fredriksberg. My belongings and myself were soon located at the village inn, there being no hotel, and now the coffee is finished and I am wondering what experiences may await me here.

February, 6th.

Fredriksberg lies in the high country to the west of central Sweden, in the most picturesque and famous province of Dalacarlia where a network of streams thread the forests and bear their burden of logs to the mill in the spring. Around the end of one of these lakes—an aimlessly winding sheet of water—has the village grown up. A typical example of a woods community, it has a village store, an inn and many small, one family houses. All of this is owned by the Hallefors Company which operates a paper mill here—the only local consumption of forest products. As spectators in an amphitheater, the brightly colored homes sit on the tree-clad slopes and look down upon the lake. They witness the drama of life in this little village played slowly and simply with the shifting seasons for scenes. How fortunate to have arrived in time to witness a real incident of this drama! Today one of the events of the year was enacted—the annual cross country skee race.

About ten o'clock the racers were gathered on the lake just before the inn. This point had been chosen as the starting place and final goal. The race was to be run in three relays with six men to each stretch. The three courses lay

between the start and two control points. All of the route was through forested and mountainous country with but little opportunity to use roads. The total distance was thirty miles, about evenly divided between the three relay distances. On the preceeding day the contestants had formed the three-man teams and each man was assigned a station to start from; either the starting point or one of the control points. Each racer then received a topographic map of the region with the starting point and the control points indicated thereon. He was supposed to select his own route and guide himself to his destination by aid of a compass. It was a trial demanding speed, endurance and skill in woods travel, as well as the training peculiar to skee running.

As the hour of ten approached, the contestents prepared to leave the start. All were young men; slender, wiry fellows. They wore very light clothing. Their shoes were made of woven wood fiber and were turned up at the toes to prevent them from slipping out from under the toe strap on the skee. The skees were birch runners about eight and one-half feet long and two and one-half inches wide. In each hand was held a light pole five feet long and shod with steel at the lower end. The equipment was completed by maps, map cases and compasses.

The moment for the start came. The men lined up and with the pistol shot they were on their way, pushing themselves across the ice by short, rapid jabs of the poles. On the smooth ice they made great speed. It was immediately evident that all had not chosen the same course because only two stuck together, these following the lake while the others broke fof the woods and were quickly lost to view in the timber.

Now that the runners had left, there was little to do but wait four of five hours until the third relay came back to the start to finish the race. We had dinner and walked some in the village, returning to the lake about two o'clock. None of the men had come in. They could hardly be expected to have covered thirty miles in that rough country before half past four. The weather was perfect, as it had been all during the morning. It was cool and the air was quite still. A cloudy sky prevented the customary glare of sun on snow which lay three feet deep on the land, although it had been blown off from the ice of the lake.

At twenty minutes after two a dark object could be seen coming through the trees on the far side of the lake. For some moments we were uncertain as to the man's identity but his speed and light clothing stamped him unquestionably as one of the contestants. He seemed almost to be falling down the slope, so great was his speed and then he shot out upon the ice. As his speed lessened, he used his poles and glided swiftly to the goal where a mob of friends grabbed the winner and gave him a congratulatory toss or two. He was Gustavsson, one of Sweden's best runners. In this final stretch he had covered twelve miles in about an hour and one half.

Within an hour the other five men came in and they were received in like manner. Of these the second was a man of almost sixty years—Gustavsson's father, a tough old hunter and ranger who is a well known character in that region. Thus ended the contest but the celebration had just commenced. A silver trophy cup was presented to the winner and then the Company extended a cordial invitation to all to come to dinner. It was hardly a dinner but rather a banquet. All of the familiar foods seemed to be there and also many strange new ones. The spirits flowed in abundance and gaiety reigned. Later the rooms were cleared and a dance started to the music of an accordion. There were some evidences of the waltz and the foxtrot but no jazz and the native dances were by all means the more popular. To judge by the footwork and the noise thereof, they might well have been called "breakdowns." At any rate it was a fitting climax for an unusual and most interesting day.

February 7th.

To-day the wonderful weather continues. The Forest Chief, Mr. Nordberg, called up before breakfast and arranged to spend the day in the woods. At nine o'clock he came in a two horse sleigh, filled with fur robes and we rode off, comfortably buried in these. The lumber company owns all of this country for miles about, so it made little difference in which direction we traveled. To examine the waterways, we followed a chain of lakes which pierce the heart of a large tract of about 450,000 acres. In this area there are but few private land holdings and these are small farms.

The timber is all Norway spruce and Scotch pine. The management is fairly intensive, a few thinnings being made before the final operation which is a clear cutting. The stands are heavy at the lower elevations but on the

mountains, and on many high, flat areas, are barrens and stunted tree growths. The climate is really very severe. On the cuttings, pine seed trees are usually left, if available, but never is spruce used for seed trees. It is too subject to windfall. Considerable planting has been done, because a period of fifteen or twenty years is required to regenerate the area naturally. At present, seeding in spots, three years after the cutting, is the usual practice. Peat bogs are plentiful—they cover thirty per cent of the area—and here considerable ditching has been done to dry the soil and relieve it of its acid constituents. In one such place, the leaders of the spruce had begun to grow twice as fast, about three years after the ditching had been done.

The timber is practically all floated to the mill. Some of it from the distant districts travels sixty miles in the water. There is a chain of six lakes, at least three of which are provided with good dams. Some of the streams through which the logs pass are only about ten feet wide but there is a considerable volume of water in them when the spring thaw comes, early in May, and all of the stream courses have been improved. Boulders have been removed and levees have been constructed at the bends and at other places where there might be danger of the logs stranding. Through the winter the logs are skidded to the lakes and laid on the ice in sections, one log deep. Just before the ice goes out, booms are laid around the logs and they are pulled down the lakes by boats. Then they are sent through the streams and lower lakes. The dams may be constructed of either earth or timber crib work, the latter being usually rock ballasted.

Scattered throughout the woods, even in the most remote districts, are small farms. These are leased to desirable occupants. The farms fall under three heads: (1) wood choppers' homes without horses; (2) farms with one horse each; (3) farms with two horses each. The number and kind of stock, as well as the area of ground to be cultivated, is definitely fixed for each farm. Let us suppose that a poor man moves into this region and he wishes to stay. If a desirable character, he may make a two year contract with the Company to let him have a farm and credit at the Company store. In return for these favors, he agrees to work in the woods at least two hundred days during the year. The workers are paid according to a definite scale which has many interesting features. Allowance is made for extra pay if work is carried on under exceptional difficulties. Fifty per cent extra is allowed for overtime on week days and one hundred per cent for overtime on Sundays. Financial aid is given to a family for each child over two, i. e. the third, fourth, fifth, etc.

The whole system is a remarkably efficient one. The forest workers live at home in a contented manner and their work usually lies in the vicinity of the home. The farms are well scattered to make every part of the forest quickly accessible. The contract system stabilizes labor conditions; there is little shifting of labor which is so important a cause of inefficiency. Nordberg introduced me to several of these families and, on inspection of their homes, I found no luxuries but the essentials of life were obviously present. The houses are comfortable and practical to withstand the severe winters.

Our whole trip to-day covered about twenty-five miles. It was so replete with interest that I was glad to return to the inn and note the important points before I forgot them.

A PRELIMINARY REPORT OF SUCCESSION ON DENUDED AREAS

By FLOYD W. GAIL

Associate Professor of Botany

So far as the writer is aware, no work on succession on denuded areas has been done in the Palouse country. The following is merely a preliminary report of a study begun in the spring of 1916, some six years ago. Five denuded meter quadrats, were made on the southwest exposure of Tomer's Butte. This butte is in Latah County, Idaho, about four miles distant from Moscow.

Some of the annuals of this slope in the spring are: Ranunculus glaberrimus, Clatonia lanceolata, Dodecatheon vulgare, Col-

linsia tenella, Tellima tenella, Clarkia pulchella and Festuca pacifica. Some of the perennials are a few scattered bunches of Agropyron spicatum, Balsamorhiza sagittata and Achillea millefolium. The majority of these plants are matured by the time the drought of summer is well begun.

The plants of the quadrats were charted in June and September of each season except the summer of 1919. The moss stage of succession has not yet appeared. No plants started during the first season. In June of the second season, nine annuals were found. The scientific names and the number of each species were:

Amaranthus blitoides	3
Collinsia tenella	5
Myosotis sp.	1

In September a dried dwarfed specimen of Amaranthus blitoides was still standing which had produced some seed. At this time, no other genera had survived the drought of the summer months.

The plants of a representative quadrat were charted in June of 1921. The results given below showed a considerable number of new invaders. The following genera with the number of each species were found:

Clarkia pulchella	5
Myosotis sp.	5
Collinsia tenella	21
Cogswellia sp.	2
Tellima tenella	3
Achillea millefolium	1
Poa ?	1

The Achillea millefolium was near the edge of the quadrat and probably came from a root of a plant adjacent to the quadrat. The results show that in five years five genera and a total of 36 species have invaded the quadrat if Achillea millefolium is regarded as having its origin from roots outside the quadrat. These are practically all annuals and mature before the drought of the summer is far advanced (Weaver, 2). The grass which resembles a Poa, but which did not fruit and the two Cogswellia are the only perennials that survived. No Amaranthus was found in September of this season.

The slowness with which succession is taking place may be better undertsood if we consider some of the physical factors.

There is in this region about 21 inches of moisture that falls annually. Only about one fourth of this moisture falls during the growing season. During the months from July to September or even to October, there is usually very little precipitation. The precipitation during these months is usually so little that it is not available for plant use.

The average weekly evaporation for 13 weeks of the growing season of 1916 was 172 ce. of water. The average daily evaporation for the same period was nearly 25.8 cc.

The evaporation for the last three weeks of August was not below 285 cc per week or an average daily evaporation of 40.7 for the three weeks. The prevailing southwest winds are responsible to a great extent for this high rate of evaporation. The high temperatures of the atmosphere and soil are also important factors. The soil necessarily becomes very dry. The average wilting coefficient of the soil on this slope is 11.21. During the summer of 1916, which, was an average summer, Gail (1) found the moisture in the soil was below that of the wilting coefficient for a period of nearly seven weeks. These facts explain why succession is so slow and why the majority of the plants on the southwest slopes are largely early maturing plants. The few perennials are deep rooted and a considerable number of them are in a resting stage during a large part of the summer months. The only conclusions that can be derived are that succession on the southwest slopes in the Palouse country is very slow. This is undoubtedly due to the extreme xerophytic conditions which prevail during the growing season. This investigation is still in progress and reports will be made from time to time as points of interest in regard to succession arise.

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PRELIMINARY NOTE CONCERNING THE CAUSE OR CAUSES OF THE DURABILITY OF WESTERN RED CEDAR, THUYA PLICATA

By HENRY SCHMITZ
Associate Professor of Forest Products

The resistance to decay of the wood of western red cedar is a well known fact, but as far as the writer is able to ascertain from the available literature the cause or causes for this resistance, although usually attributed to the presence of a toxic resinous substance, are still partly unknown. It may also be due to any other toxic substance which may occur in the wood or to some mechanical effect produced by the cell walls themselves. Then, too, recognizing the almost infinite number of possible isomers of such a complex molecule as cellulose, durability of certain woods may be due to the structure of the cellulose molecule itself, a somewhat similar phenomenon is shown by the more simple sugars with reference to their great variation in fermentability.

The present note reports the results of some preliminary experiments dealing with the extraction of the toxic principle from the wood of red cedar.

Samples of ten grams each of finely ground red cedar sawdust (which had been sifted through a sieve having a one millimeter mesh) were treated in a Soxhlet's extraction apparatus for six hours with the following solvents: water, ethyl alcohol, petroleum ether, acetone, chloroform, benzol and ether. After the extraction was completed, the volume of the extracts was reduced to 100 cc., making each 10 cc. of extract the equivalent of one gram of sawdust.

Ten cc. of the various extracts were then added to one gram samples of lowland white fir (Abies Grandis) sawdust in glass test tubes and the solvent evaporated at 35 deg. C. Distilled water was added to the sawdust and then the tubes and contents were sterilized at ten pounds pressure for fifteen minutes. A control series of white fir sawdust to which the various pure solvents had been added and evaporated was also set up in addition to the regular red cedar and white fir controls.

One gram samples of the extracted red cedar sawdust were also placed in test tubes and distilled water added and sterilization affected as before. All of the culture tubes were then inoculated with Lenzites saepiaria.

After one and two weeks, the tubes were carefully examined with a hand lens in order to determine in which tubes and to what extent growth had taken place. The results are shown in Table I.

TABLE I. EFFECT OF TREATING RED CEDAR SAWDUST WITH VARIOUS SOLVENTS, AND OF ADDING THE EXTRACT TO AN EQUAL AMOUNT OF WHITE FIR SAWDUST

Solvent	Red Cedar after extracting	White Fir with red cedar extract (Solvent evaporated)	White fir with pure solvent (Solvent evaporated)
Water	Fair growth	Good growth throughout entire sawdust	Good growth throughout entire sawdust
Alcohol	Good growth throughout entire sawdust	No growth	Good growth throughout entire sawdust
Petroleum Ether	No growth	No growth	Good growth throughout entire sawdust
Acetone	Good growth throughout entire sawdust	No growth	Good growth throughout entire sawdust
Chloroform	Very limited growth from inoculum	No growth	Good growth throughout entire sawdust
Benzol	No growth	Limited Growth	Good growth throughout entire sawdust
Ether	No growth	No growth	Good growth throughout entire sawdust
Control	Red Cedar	No growth	
Control	White Fir	Good growth throughout entire sawdust	

The results are more or less self-explanatory, but a few pertinent points may admit of further discussion. First, after extracting red cedar sawdust for six hours with distilled water, not only is this sawdust susceptible to decay, but the aqueous extract when added to white fir sawdust will not inhibit its decay. This result may be explained in several ways. First, that the toxic substance was broken down or hydrolized during the extraction. Secondly, the amount of toxic substance may have been reduced sufficiently to allow fair growth of **Lenzites saepiaria** in red cedar sawdust when inoculated with the fungus, yet the extract did not contain a sufficient amount of the toxic principle to render white fir sawdust resistant to decay. Or, lastly, it may even be possible that in the six hours extraction the cell wall constituents became slightly modified, thus changing their resistance to decay.

Acetone and ethyl alcohol seem to extract the toxic principle most completely, leaving the red cedar sawdust very susceptible to decay, and the extract, when added to white fir sawdust, prevents the growth of **Lenzites saepiaria**.

Further experiments dealing with the cause or causes for the durability of western red cedar are now in progress in this laboratory.

A CAMP FIRE

I can see the silent evening sky,
  O'er snow capped copper peaks,
And feel the shelt'ring hand of God,
  In the wind that almost speaks.

The trees are rugged, straight and tall,
  The night is big yet near,
God and I are there alone
  In a silence I almost hear.

The roaring of the canyon falls
  Comes splashing down the stream
And I'm wond'ring by my campfire
  If I live or only dream.

There's a spell about the campfire
  That holds me to the trail,
Altho I never reach success
  I seem to never fail.

Battles are fought and struggles won
  Among the campfire's brands,
Secrets are told and secrets got
  When sympathy a soul demands.

And memories both sad and sweet
  Blaze in the cinders gold
Youthful dreams and castle's fine
  This melting pot of life enfolds.

Oh, many maids and many men
  The spell of the embers bright
Have felt, and marvelled at its call
  But heeded not its wondrous light.

Yes, I'm dreaming of old campfires
  'Neath a cultivated tree
And I thank God for my mem'ries—
  Those, no one can take from me.

Stanley Bartlett

FIVE NEEDLE PINE IN INDIA

By P. D. SHARMA, M. F., '22

Distribution

This five-needle pine is found in the Himalayas between 6,000 to 12,000 feet elevation. Its zone is much the same as that of Deodar (**Cedrus libani var. Deodara**), but it is usually most at home at about 7000 to 9000 feet.

Locality

This species grows on almost any soil, and is often found in very exposed situations and on rocky ground. Trees have been seen growing on practically bare rocks in the crevices.

Shape and development

This pine is a large tree capable of attaining 120 feet in height and 10 feet or more in girth at B. H. It has the habit of throwing out long horizontal side branches, which often persist even when dry, causing hard, resinous knots right thru the trunk to its core. It is a gregarious species and exceedingly light loving. It grows fast, the rate varying with the soil and climate. On an average, it takes about 120 years to attain 2 ft. D. B. H.

This pine has five needles in a cluster and cylindrical soft scaled cones. Flowers appear in spring and fruit ripens in the autumn of the following year.

Character of Forest

It is often found mixed with deodar, oaks and rhododendron. Having itself a very light crown, it thrives well in company with heavy foliaged trees, like the oaks, which enrich the soil. In presence of sufficient direct light, it tends to become invasive, and by its comparatively rapid growth to dominate over other species. It makes an excellent nurse tree to deodar, which is far more valuable.

Reproductive Power

Natural regeneration is easy in all areas protected from fire. It seeds every year, with especially good seed years at intervals. The male and female flowers are on separate branches. In blanks, on grassy lands and wherever available ground with full sunshine is found within reach of the parent tree the seed, which is light and winged and may be carried by the winds a long distance, on falling, germinates and patches of young pure pine are noticed.

Sowing and planting

Sowing is not difficult, but the seedling is difficult to prick out and transplant. Direct sowings have proved best. The planting, however, is done with balls of earth or in baskets.

Tending

Being a very light demanding species, it requires no tending. The crop thins out quickly after establishment. Of course, when young, protection from grazing is necessary, as well as from fire.

Method of Treatment

When pure, crops of blue pine are best treated by the uniform method. No preparatory and no secondary fellings are required and the old crop may be realized and the regeneration effected by two fellings, a seed and a final felling at an interval of 10 years. When grown in mixture, the selection method is most applicable. Six feet girth at B. H. is taken as exploitable size.

Utility

The timber is considered superior to that of three needle pine and is ranked second to deodar (which is considered as one of the best timber trees in the world). It lacks the durability which places deodar in the first rank, but it is superior to deodar in elasticity.

Wood is pinkish in color, compact, even grained and handsome, not very hard but easy to work. It has distinct annual rings and prominent resin ducts. The medullary rays are fine and give something like silver grain on radial section. Wood floats well, makes good railway ties, and is largely used for construction. It is also tapped for resin but yields less quantity than three needle pine. The wood is in great demand for fire wood or charcoal, for both of which purposes it is excellent, the dry wood containing only 0.35 per cent of ash.

This description will show that nature practically works in the same way throughout the world. Here in America we have the white pines with their needles in bunches of five, while on the Himalayas, 20,000 miles away from America, a pine of similar character grows.

PERSONALS

E. H. Myrick writes "I have been promoted to Forest Supervisor on the Lewis & Clark National Forest at Chateau, Montana, effective April 1."

Major Herbert A. Wadsworth, Infantry, U. S. A. '11, is stationed at Fort Howard, Md., where he is on duty with Headquarters, Third Corps Area, and assigned as Assistant for Operations in the General Staff Section. Prior to reporting at Fort Howard in November, Major Wadsworth was on duty in France for almost two years with the American Graves Registration Service.

Lloyd A. Fenn, '11, one of the first three graduates of the Idaho School of Forestry has been practicing law at Kooskia, Idaho since 1919. He was married to Miss Shirlie Shunk of Missoula, Montana in 1918. He spent 4 years with the U. S. Forest Service upon leaving school and then entered the Montana Law School hoping that as a lawyer his summers would be more peaceful than he found them as a forest ranger. Although no longer a forester himself, Mr. Fenn is one of the best friends of forestry in Idaho and as such still keeps in very close touch with the School and its activities. He was one of the principal speakers at the annual banquet of the Forest School last winter.

The following extract from a letter from A. D. Decker, '13, indicates that he has no trouble keeping busy as Land Agent for the Potlatch Lumber Company, Potlatch, Idaho. "My work in the winter consists largely in looking after the tax matters of the company, the land and timber records, and the work connected with land settlement and development. Our summers present a variety of work found in but few other lines. It varies thru the season from showing sheep herders onto allotted ranges, acting as scout, guide or interpreter for land tourists and home seekers, land appraisals and survey work to appearing before the state and county boards on tax matters. The company also has a considerable acreage of agricultural land which we farm. I am now among those married, having been married last fall to Miss Charlotte Laird of Potlatch."

C. E. Favre,'14, says: "I am now located at Elko, Nevada as Supervisor of the Humboldt National Forest. In addition to my work on the Humboldt, I have inspection work to do on two other Forests in central Nevada. Mrs. Favre and I remember, with pleasure, our recent trip to the University of Idaho, and we certainly wish the institution were closer in order that our visits might be more frequent."

Ralph H. Parsons, ex '14, writes as follows from Coeur d'Alene, Idaho: "Since leaving "Idaho", have been working with the Forest Service in Idaho and Montana. Was on Timber Survey work from 1912 to 1915 during the summer months. Appointed as Ranger in 1915 and worked on Land Classification for three years. Married in 1916. Moved to Coeur d'Alene Forest in 1918 and given a ranger district for three years. From now on will take over the planting work on the forest and also be assigned to timber sales work. The family consists of one extra—a girl four years old."

Howard C. Gildea, ex '14, is practicing law at McMinnville, Oregon, making a living, gaining experience and devoting all spare time to the American Legion. Specialty: speaking before Y. M. C. A. and Women's Clubs. Has managed to keep out of politics, almost, so far, and is still looking for the ideal girl.

Mark Anderson, ex '15, is manager and half owner of the Hotel Roberts, Provo, Utah, the largest hotel in Utah south of Salt Lake City. He left Forest Service August 1, 1919 and says he has one wife and two boys, one 3 years and one two months, both born on January 30.

Wm. R. Schofield, '16, writes: "My present location is Chinook, Montana, where I am engaged in Engineering business and hold the office of County Surveyor of Blaine County, Montana. Just recently I received a letter offering me an appointment as Deputy Supervisor on the Wyoming-Bridger Forest in Wyoming, which offer I am considering seriously and by the time the publication is out I may again be engaged in Government Forestry work. I am married to a University of California girl, formerly Miss Elizabeth McMillan, daughter of a Eureka, California, lumberman. We have a son, Richard McMillan

Schofield, five months old. My advice to those of you who are completing the work in Forestry is that you stick by forestry work and not chase the rainbow, thinking that other work pays more and that is what you want. The education of Forestry will be so firmly instilled in your life that you will not be satisfied in any other work but that concerned with the business of Forestry. To the technically trained forester, there is no greater service to mankind than that which may be rendered in the application of forestry training in the conservation and utilization of one of nature's most important resources."

D. H. Yates, '17, writes: "I am still with the Potlatch Lumber Company in the Land Department. In fact, it isn't very difficult to keep track of me. Also, I am still married though I haven't 'any other items of a personal nature' around the house—yet. I see Russ Cunningham, Tom Jackson and I. W. Cook occasionally as they stop between trains, and I manage to get over to the Forestry School frequently. I would like to see a reunion of the old gang some time, but presume we are pretty well scattered now for that."

Harry E. Malmsten, '17, is with the U. S.. Forest Service, Ogden, Utah. Occupation: range investigations, the object of which is to devise better methods for full utilization of the grazing resources in the United States, particularly in the National Forests of the Rocky Mountain Region. Harry is still single and probably will remain so as long as he roams the high mountains and the hot deserts. Altho he is called by some "a sage rat", he occasionally enjoys getting up at high elevations where the snow lies in drifts until August. He is rather fond of the high altitudes, especially during the months of July and August.

R. N. Cunningham, '17, has been assigned to Weeks Law Inspection for the U. S. Forest Service with headquarters at Missoula, Montana and writes: "Am just plugging along at the forestry business—no wife, no kids, no prospects of any—still poor and own no oil stock."

Herbert W. Johnston, "Red", ex '17, is with the U. S. Biological Survey, Unalakleet, Alaska. Occupation: Range Investigations. The object of which is to determine the amount of grazing resources in Alaska suitable for grazing reindeer. Proper methods of handling and managing reindeer herds are being worked out. "Red" is single and expects to stay single as long as he remains in Alaska. When it comes to "mushing", "Red" is "some musher" and surely knows how to handle the "huskies".

Clyde P. Humphrey, ex '17, writes: "Since leaving Idaho in winter of 1916-17 have spent nearly two years in U. S. Engineer Corps, sixteen months of it overseas; six months at Moscow with the local Highway District on location and construction of highways. Since October, 1919, have been employed by the Idaho State Bureau of Highways on location and construction of hard surfaced highways. By the time the Idaho Forester is in press will be located at Coeur d'Alene on construction of a hard surfaced project. For the benefit of the old 'timber beasts', I am no longer running at large, having but recently become a Benedict."

John Gilman, Ex '19, is at present caretaker of a Hunting Lodge and may be addressed at Obsidian, Idaho, via Stanley.

Paul J. Martin, Ex '19, forsook forestry for the insurance business and is now special agent of the Liverpool & London & Globe Insurance Company Limited for the Idaho and Eastern Washington district, with headquarters at Spokane, Wash. The following extract from a letter recently received from him indicates that his interest in forestry is still keen. "The department of Forestry of any school or college has unlimited possibilities to assist materially in the development of this great nation of ours. The subject of timber utilization and conservation is indeed most timely. I sincerely believe that the men of the Forest Service have one of the most patriotic callings of the present day. This great army of men is far sighted and broad visioned. Looking into the future, they see that unless the tactics and present methods are changed, it will not be long before our timber resources are exhausted due to extravagant waste. I am glad to see that so much intensive work is being done along lines of reforestation.

"Not only does the study of Forestry and work in the great forests of this country fit a man for a high and profitable vocation, but it at the same time makes men and builds character. If I had a dozen boys it would be my sincere desire that each should

spend at least a year in this great service, and I would encourage one or all to the calling as a life work. By environment and necessity a fellow is compelled to think for himself and act quickly. What greater asset could a man possess be he lawyer or doctor?"

George L. McMullin, Ex '18, writes: "I am acting as manager of the Specialty Department for A. Carlisle & Company, 251 Bush Street, San Francisco, California. This organization is one of Manufacturing Stationers, Printers and Lithographers and my end of the business consists in handling certain loose leaf and duplicating device specialties."

George M. Hammond, Ex '20, says: "I left school in the early spring of 1918 and enlisted in the Heavy Coast Artillery branch of the service from which I was discharged, after gaining much practical experience, in the latter part of November of the same year. I returned to Pocatello where I married Miss Elizabeth Bowerman, an L. & S. student at "Idaho", on December 10. After a short visit with my parents in Boise, I went into business with my father-in-law, Mr. Chas. C. Bowerman, who owned and operated three retail yards in and around Pocatello, on January 1, 1919. Due, I suppose to the knowledge I was able to absorb while taking the forestry course at Idaho, I have been able to hold down, with this concern, a minor job ever since.

"While I took the Engineering Forestry course at school, having in mind the fitting of myself for a cog in the wheel of the productive end of forestry, I find that the general knowledge has helped me greatly in the selling end of the game. To illustrate: I, having familiarized myself with the texture, et cetera, of the woods native to this northwestern part of the country and having a knowledge of where the various stands of wood are located, am able to place our orders where we will get the kinds of materials best suited for the demands of the trade. It is a small item in the line of service, but after all, service is a good foundation on which to build a future growing business. I could relate many ways in which I am able to apply the course to my every day work."

E. T. Nero, Ex '22, writes from Orofino, Idaho: "I am a forest ranger on the Clearwater National Forest and intend to get a furlough next fall so that I will be able to finish my college course next winter."

G. B. Chamberlin, Ex '22, writes from Coeur d'Alene, Idaho: "Since leaving school, I have worked a year in the Rutledge saw mill, learning the manufacturing end of the lumber business. Later, I was transferred to the shipping end and lastly to the Retail department in which I learned the grading and selling of lumber. The lumber business was not flourishing that year, so July 1, I changed companies. A few days later, I went up in the woods as an assistant engineer, looking after the bridge construction and station work on a logging railroad for the Winton Lumber Company. Owing to the fact that it was a short season in the woods, my work was finished in three months. I came home and went to work grading and scaling lumber in the shipping department of the Winton Lumber Company. I expect to be in town until the woods operations are resumed. I am not married, but I presume a charge will be fronting me in a few years, as I think it is the one ambition of every young man; also older ones."

Fred B. Chamberlin, Ex '23, writes: "I have been with the Pacific Spruce Corporaton, Toledo, Oregon, since it was organized My capacity now is that of cook and rooming house manager. I have charge of all distributions of time and look after hiring of men. All of this keeps me out of mischief.

Roy Russel Webster (R. C.) '15-16, says: "I am at present working for the Rubedew Lumber Company at Post Falls, Idaho. However, during the summer, I have a steady position with the Post Falls Box and Mfg. Company. I am married."

T. D. Cowan, (R. C.) '15-16, entered the U. S. Forest Service as ranger in the spring of 1917. In Oct., 1917, was furloughed for military service. Spent 18 months over seas with engineering regiment. July, 1919 returned and was reinstated in government service. Is now employed on the Targhee National Forest in Southern Idaho.

Edwin E. Newkirk, (R. C.) '16-17, writes: "For the past year, I have been in the government mail service and at present am a substitute railway mail clerk in the St. Louis Terminal. I am still single and poor. My greatest ambition is to eventually establish myself in the northwest. I have never lessened my enthusiasm about Idaho and am planning to return to Moscow next fall."

Ernest M. Martin, (R. C.) '19-'20, says: "I will be employed as Forest Guard on the Weiser National Forest this coming summer. At present, I am going to Weiser High School, but am still looking forward for a regular course in the Idaho School of Forestry."

Albert C. White, (R. C.) '19-'20, writes: "I have only recently been discharged from the Veteran's Hospital in Boise where I have been for the last nine months, receiving treatment for disabilities received while in service. I am feeling much better now and hope to get into the harness again."

V. R. Hallcraft, (R. C.) '20-'21 says: "I can say that I have met with every success since leaving the U. of I. I took the Forest Ranger examination October 25, last and thanks to my university training, passed with a good mark. I was stationed on the Payette National Forest last year and have just received instructions to report May 16 next, to the same station. I expect an appointment this summer."

Edwin C. Rettig, '19, visited the school early in April. He is still with the Clearwater Timber Protective Association.

Tom Jackson, '19, had a paper on "The Value of University Training to the Logging Engineer" read before the Pacific Logging Congress at San Francisco last October.

H. W. Staples, '20, is now operating assistant of the gold dredging operations of the Yukon Gold Co. at Murray, Idaho.

J. P. Drissen '21, and C. R. Patrie, '21, spent several months during the winter doing graduate work at the school after timber sale work on the Coeur d'Alene National Forest closed down. Drissen has now accepted an appointment as Scaler with the U. S. Indian Service at Chiloquin, Oregon, and Patrie is an inspector for the White Pine Blister Rust control under the Bureau of Plant Industry, with headquarters at Portland, Ore.

O. C. Munson, '21, after hanging telephone lines upon the cliffs in the south fork of the Salmon River country last summer, migrated to Los Angeles, Cal., where he again took up telephone construction work.

Frank A. Brown, '22, will be engaged during the summer with the Bureau of Plant Industry, scouting for White Pine Blister Rust in north Idaho.

J. W. Farrell, '22, has accepted an offer for employment with the Boise Payette Lumber Co., Emmett, Idaho. He will spend the summer on fire protection but hopes to get into the manufacturing end of the business in the fall.

W. B. Miller, '22, who has an appointment with the U. S. Forest Service as Grazing Assistant, will be chief of a grazing reconnaissance crew on the Filmore National Forest in Utah this summer.

Herman Bauman, '23, will be a member of the fire survey party which will continue the reconnaissance of the burned portions of the Clearwater National Forest this summer.

A. S. Daniels, '23, will go back to his old job as commissary clerk on the Selway National Forest this season.

Paul Gerrard, '23, was forced to leave school during April when his leave of absence from the U. S. Forest Service was cut short by his promotion to the position of Fire Assistant on the Clearwater National Forest.

Russell Parsons, '23, will go back to the Selway National Forest this summer to continue work on the extensive reconnaissance initiated last year.

J. W. Rodner, '23, one of the regular lookouts for the Coeur d'Alene Timber Protective Association will resume his old post again this season.

A. M. Sowder, '23, has a job for the summer in the woods with the Edward Rutledge Timber Co., of Coeur d'Alene.

J. W. Stoneman and Leslie Eddy, '23, will return to the Clearwater National Forest for fire duty this season. Edwin Chamberlin, '24, who had to drop school at the end of the first semester for financial reasons will also return to the Clearwater organization this year.

A. N. Cochrell, who attended the ranger course this year now is in charge of the Oxford District on the Clearwater National Forest. F. W. Shaner and Ray Ferguson, both of the Federal Vocational Course, will be on Cochrell's district this summer.

The Clearwater National Forest will also take Lewis Cummings, '25, as lookout and Guy V. Williams, '25, as smoke-chaser this season.

Murl Markham, '24, and Don Fisher, '25, are engaged for the summer by the Nez Perce National Forest.

Earl Bradfield, '24, has secured summer's work on the Coeur d'Alene National Forest.

Walner Peterson, '24, will be employed in

the plant of the Potlatch Lumber Co., again this summer.

Ralph Space, '24 and Ralph Hand, (R. C.), have summer jobs on the St. Joe National Forest.

George Madlinger, '24, will be engaged as smokechaser at the Priest River Experiment Station for the summer.

Paul Harlan, and Howard Kent, '25, will remain in Moscow during the summer to attend the University summer school.

D. S. Man, '25 who comes from India plans to spend the summer checking up on the stories he has heard of the wonders of California.

John H. Zuver, '25, will return to his home in Indiana for the summer vacation.

Paul Bieler, (R. C.) has work for the summer as smoke-chaser on the Payette National Forest.

Stanley Bartlett, (R. C.) has returned to his home in Maine and expects to be employed by the state forestry department this summer. One of his poems was published in "American Forestry" for April, 1922.

Ben C. Maxwell, (R. C.), has a position on the Wenatchee National Forest, Wash.

Neal Poynor, (R. C.), will probably work on the Weiser National Forest again this summer.

R. M. Rudesill, (R. C.), returned to his home in Pennsylvania upon the completion of his work here.

Lawrence Autrey, Lester Eby, Howard Higgins and George W. Clark have been assigned to the Umatilla National Forest, Pendleton, Oregon for the summer.

The Colville National Forest, Wash., will use Norman E. Taylor, Joseph Hamel, Frank Folson and L. H. Melchisedeck this summer.

Lawrence Luby and France Reuterskiold will go to the Caribou National Forest and L. E. Willey to the Chelan National Forest, Wash., for the summer.

John B. Taylor, U. S. Forest Examiner, Missoula, Mont., and former instructor in grazing here, visited the University early in May, a train wreck affording him the opportunity to stop over and renew old acquaintances.

Willard Storms, Ex '23, after spending several months at the Federal Hospital at Whipple Barracks, Prescott, Ariz., was married at Christmas time and is now at his home in Rupert, Idaho.

Orrin Gudmunsen, '25, will be a member of a grazing reconnaissance party on the Cabinet National Forest, Montana.

Cecil Ryan, '23, Earl Bradfield, '24, and Elva Snow, '24, will be members of a party in charge of Dr. Schmitz, scouting for White Pine Blister Rust in North Idaho.

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1921—1922. The information after each name is in the following order: 1, name; 2, home address; 3, fraternity; 4, honorary fraternity; 5, scholastic achievements and athletics.

GRADUATE.

Drissen, John Phillip; Harrison, Idaho; Xi Sigma Pi; President Associated Foresters, 1920-21; Associate Editor, "Idaho Forester", 1920 and 1921.

Patrie, Carthon Roy, 7 Plymouth St., Plymouth, Wisconsin; Xi Sigma Pi; Editor, "Idaho Forester", 1921.

Sharma, Parmeshri Das; Imperial Forest College of Dehra Dun, India.

1922

Brown, Frank A., 308 State St., Boise, Idaho; Kappa Sigma; Sec. Treas. Associated Foresters, 1918-1919; Associate Editor, "Idaho Forester", 1920 and 1921; Vice President, "I" club 1920-1921; Football, "I", 1919, 1920 and 1921.

Farrell, James W., New Meadows, Idaho; Phi Gamma Delta; Xi Sigma Pi, Alpha Zeta; Sec. Treas. Associated Foresters, 1919-20, Vice President Associated Foresters, 1920-21, Editor "Idaho Forester", 1920, Ass't. Bus. Mgr., "Gem of the Mountains", 1922.

Miller, William Byron, Stevenson, Wash.; Xi Sigma Pi, Alpha Zeta, Editor, "Idaho Forester". 1922.

1923

Bauman, Herman, Milwaukee, Wisc., Xi Sigma Pi; President, Associated Foresters, 1921-22.

Daniels, Albert Stanley, Bay City, Mich; Phi Gamma Delta; President, Associated Foresters, 1919-20, Glee Club 1921-22.

Gerrard, Paul Henry, Vancouver, Wash., Beta Theta Pi; Xi Sigma Pi.

Melick, Harvey Ivan, Nampa, Idaho.

Melick, Marshall S., Bethlehem, Pa., Glee Club 1921-22.

Parsons, Russell Wm., Moscow, Idaho; Beta Theta Pi; Xi Sigma Pi; Asst. Bus. Mgr., "Idaho Forester", 1922.

Rodner, Jack W., Moscow, Idaho; Sigma Alpha Epsilon; Vice Pres. Associated Foresters, 1921-22, Assoc. Editor, "Idaho Forester" 1922.
Ryan, Cecil C., Moscow, Idaho; Kappa Sigma.
Sowder, Arthur M., Coeur d'Alene, Idaho.
Stoneman, J. Warren, Hillyard, Wash.; Sigma Alpha Epsilon; Track "I" 1921.

1924

Bradfield, Earl Francis; Pocatello, Idaho.
Chamberlin, Edwin William, Moscow, Idaho.
Chamberlin, Cecil, Kendrick, Idaho.
Eddy, Leslie Eugene, Moscow, Idaho. Business Manager, "Idaho Forester", 1922.
Edwards, Kenneth D., Nampa, Idaho. Phi Delta Theta.
Madlinger, George J., Poughkeepsie, New York; Business Manager, "Idaho Forester" 1921, Assoc. Editor, "Idaho Forester" 1922.
Markham, Murl J., Grangeville, Idaho. Sigma Alpha Epsilon.
Nicol, Henry, Reubens, Idaho.
Peterson, Walner L., Potlatch, Idaho.
Snow, Elva A., Boise, Idaho. Kappa Sigma.
Space, Ralph; Weippe, Idaho.
Wetherbee, Lawrence E. Chicago, Ill.

1925

Connors, John; Prichard, Idaho.
Cummings, Lewis; St. Petersburg, Fla.
Doyle, Ivan; Moscow, Idaho.
Fisher, Don C., Grangeville, Idaho. Kappa Sigma.
Goddard, Charles Vance, New York, N. Y.
Green, Edwin G., Moscow, Idaho.
Gudmunsen, Orin Sylvester; River Falls, Wis.
Harlan, Paul McLean; Jackson, Tenn. Kappa Sigma.
Holbrook, Frank C.; San Francisco, Cal. Kappa Sigma.
Kaufman, James E.; Orofino, Idaho.
Kent, Howard A.; Bonners Ferry, Idaho. Kappa Sigma.
Man, D. S.; India.
Pearce, Paul Stanley; Spokane, Wash.
Williams, Guy K.; Boise, Idaho. Sigma Nu.
White, Harold Z.; Moscow, Idaho.
Zuver, John H. Jr., South Bend, Ind.

Unclassified

Autrey, Lawrence; Hauser Ferry, Wash.
Bloss, Frank; Portland, Ore.
Clark, George Wm.; Toushet, Wash.
Eby, Lester W.; Walla Walla, Wash.
Ferguson, Ray S.; Clarkston, Wash.
Folsom, Frank B.; Elizabethton, Tenn.
Franklin, A. A.; Harrison, Idaho.
Hamel, Joseph Henry; Bremerton, Wash.
Higgins, Howard H.; Fredricktown, Ohio.
Jones, Lloyd A.; Monida, Mont.
Linck, Arthur R.; Boise, Idaho.
Luby, Lawrence L.; Idaho Falls, Idaho.
Melchisedeck, L. H.; Moscow, Idaho.
Perkins, Glen C.; Pocatello, Idaho.
Perkins, Parley; Dayton, Idaho.
Reuterskiold, France; Ft. Atkinson, Wisc.
Runberg, Victor; Potlatch, Idaho.
Shaner, Fred William; Orient, Wash.
Southard, Fred C.; Moscow, Idaho.
Taylor, Norman E.; Oroville, Wash.
Van, George; ——
Wheeler, Byrl; Weiser, Idaho.
Willey, Lewis Edwin; Thornton, Wash.

Ranger Course

Bartlett, Stanley Foss; Locke Mills, Me.
Bieler, Paul; Jersey City, N. J.
Cochrell, Albert N.; Greer, Idaho.
Hallcraft, Vernon Ralph, New Meadows, Ida.
Hand, Ralph L.; Ashville, N. Y.
Humm, Howard M., Colorado Springs, Colo.
Kelly, Robert C.; Bradford, Pa.
Maxwell, Ben C.; Waynesville, N. C.
Poynor, Neale E.; Council, Idaho.
Rudesill, Ralph M. Bradford, Pa.

ALUMNI AND FORMER STUDENTS

The following list of alumni and former students is not complete. Additions and corrections of addresses given will be appreciated as we desire to keep a complete and accurate list of all former students.

Allen, Thomas Wm.; Ex-'22.
Anderson, Mark, Ex-'15; Provo, Utah. (Hotel Manager.)
Ashton, Allen White; Ex-'22.
Barger, Harold B, Ex-'17; Browning, Mont.
Bedwell, Jesse Leonard, '20 B. S. (For.); Council, Idaho. (U. S. Forest Ranger, Caribou National Forest.)
Berry, Waldo Lee, (R. C.) '15-'16; Post Falls, Idaho.
Brockman, Cecil C., Ex-'23; Bickelton, Wash.
Buckingham, William E., m, Ex-'22 Gifford, Idaho. (Ranger, U. S. F. S., Orofino, Idaho.)
Burns, Robert Owen, Ex-'15; Payette, Idaho. 625 Hoymount, Fayelleville, N. C.
Cable, Guy Burr, Ex-'22; Roberts, Idaho.
Chamberlin, Fred, Ex-23; Coeur d'Alene, Ida. (Pacific Spruce Corp., Toledo, Ore.)
Chamberlin, Gail B., Ex-'22; Coeur d'Alene, Idaho. (Winton Lumber Co.)
Carlson, Oscar, '15, B. S. (For.), deceased.

Cook, Jacob Miller, Ex-'20; Oberlin, Kansas.

Cooper, Alfred, Ex-'20; Los Angeles, Cal.

Core. Glenn R. Ex-'23; Burley, Idaho.

Cossitt, Floyd Morgan; Weiser, Idaho. (U. S. F. S., Kooskia, Idaho.)

Cowan, Talmadge D., (R. C.) '15-'16. U. S. Forest Ranger, St. Anthony, Idaho.

Cross, Sidney W., Ex-'23.

Cunningham, Russell N., '17 B. S. (For.), U. S. Forest Service, Missoula, Montana.

Darnall, Glenn McClellan, Ex-'16; Payette, Ida.

Darrah, Lionel Leonard, (R. C.) '20-'21; Moscow, Idaho.

Dart, William Ellisworth, Ex-'20; Moscow, Idaho.

Daugherty, Charles Ira, Ex-'22; Challis, Ida.

Davis, Roscoe Richard, Ex-'21; Star, Idaho.

Decker, Arlie Delos, '13 B. S. (For.), M. F. Yale University, '17. (Land Agent, Potlatch Lumber Co., Potlatch, Idaho.)

Denning, Steward K., Ex-'13. 3-22 3067-Bateman St., Berkeley, Cal.

Dipple, Ralph, Ex-'14. (Dentist, Springfield, Oregon.)

Dodge, Keith Allen, (R. C.) '15-'16; Challis, Idaho.

Drissen, John Philip, '21, B. S. (For);Harrison, Idaho. (U. S. Indian Service, Klamath, Oregon.)

Duncan, Robert, (R. C.) '16-'17.

Eldridge, Ferris Edwin, Ex-'18.

Elhart, Carlton D., Ex-'22; Caldwell, Idaho.

Evans, Philip Smith, Ex-'20; Preston, Idaho.

Faucett, Vernon, 'Ex-'14.

Favre, Clarence Eugene, '14 B. S. (For); '15, M. S. (For), (Supervisor, Humboldt National Forest; Elko, Nevada.)

Fenn, Lloyd Alfred, '11 B. S. (For.), Kooskia, Idaho; (Attorney at Law; Manager, "Kooskia Mountaineer".

Fields, Charles Carlos, Ex-'14.

Flyg, Carl Jacob, (R. C.) '20-'21; Shelley, Ida.

Fuller, Harry E., Ex-'24; Emmett, Idaho.

Gildea, Howard Cecil, Ex-'14; McMinnville, Oregon. (Lawyer.)

Gavin, C. H., Ex-'23; Heise, Idaho.

Gilman, John Elmo, Ex-'19; Obsidian, Idaho, via Stanley.

Griep, Kenneth, Ex-'24; Fruitland, Idaho.

Hamilton, William Howard, Ex-'22; Santa Paulo, Cal.

Hamilton, Richard Alverd, Ex-'19; Orofino, Idaho.

Hammond, George M., Ex-'20; Pocatello, Idaho. (Bowerman Lumber Co.)

Haladay, Howard Wesley, Ex-'16, Deceased.

Hanzen, Maurice Henry, Ex-'20; Moscow, Ida.

Hart, Irving Warren, Ex-'22; Boise, Idaho.

Haynes, Ralph M., (R. C.) '16-'17; Emmett, Idaho.

Headick, Ralph Alonzo, (R. C.) '16-'17; Moscow, Idaho.

Heard, Herman Claude, Ex-'13. —'19—County Agent, Phoenix, Arizona.

Helfrich, Will Edward, Ex-'15.

Herman, Charles Henry, '13 B. S. (For.) Enterprise, Ore. (Manager, East Oregon Lumber Co., Enterprise, Oregon.)

Hillman, Wm. P., Ex-'13.

Hockett, Robert Vestal, Ex-'13.

Humphrey, Clyde Pearson, Ex-'17; Coeur d'Alene, Idaho. (State Highway Dept.)

Huestis, Clarence, (R. C.) '16-'17; Council, Idaho.

Hyde, Clarence Otis, Ex-'19; Oreana, Idaho. (Bank Clerk, Spokane, Wash.)

Jackson, Tom, '19 B. S. (For.); Clarkia, Ida. (Logging Eng, Edw. Rutledge Timber Co.)

Jensen, Irving R., (R. C.) '16-'17; Essex, Mont. (U. S. Forest Service)

Johanson, Robert, (R. C.) '20-'21; Orofino, Idaho.

Johnston, Herbert Wm., Ex-'17; U. S. Biological Survey, Unalakleet, Alaska. (Range Investigations).

Joke, J. A., (R. C.) '15-'16; Moscow, Idaho.

Jones, Renaldo Vincent, Ex-'15; Albion, Ida.

Jones, William McKinley; Nampa, Idaho.

Kambridge, Antone J., Ex-'16; . (Farmer) Genesee, Idaho.

Keefe, Frank, Ex-'15.

Keyes, George W., Ex-'22; Challis, Idaho.

King, Leonard Austin, (R. C.) '20-'21; Orofino, Idaho.

Kingan, Fred, Ex-'22.

Lommason, Thomas, Ex-'17, U. S. F. S., Ogden, Utah (Grazing Assistant).

Lundstrum, F. J., '11 B. S. (For.); Lewiston, Idaho. '16—633 Shatto Place, Los Angeles, California.

McMullin, George Leiby, Ex-'18; 251 Bush St., San Francisco, Cal. (Stationery Specialties).

McNett, Gail, Ex-'16; Rathdrum, Idaho.

Martin, Ernest M. (R. C.), '19-'20; Weiser, Idaho.

Martin, Paul J., Ex-'19; 1200 Old National Bank Bldg., Spokane, Wn., (Insurance Bus.)

Maruska, Joseph, (R. C.) '20-'21; Sandpoint, Idaho.

Massey, Ivan M., Ex-'23.

May, Henry W., (R. C.) '19-'20.

Malmsten, Henry Elof, '17 B. S. (For.) U. S. F. S., Ogden, Utah. (Range Investigations).

Melzian, Wesley, (R. C.) '20-'21; Sleepy Eye, Montana.

Miller, Lilas Warren, Ex-'22; Nampa, Idaho.

Miller, Robert Adolph, Ex-'22; Twin Falls, Idaho.

Moody, Virgil Carlton, '17 B. S. (For.), Hope, Idaho.

Morris, Leo Francis, Ex-'16; Weiser, Idaho. —408 Savings & Loan Bldg., Spokane, Wn.

Morrison, Frank Bernard, Ex-'22; Barber, Ida.

Munson, Oscar C., '21 B. S. (For.), Moscow, Idaho.

Myrick, E. H., Supervisor, Lewis & Clark National Forest, Choteau, Montana.

Nero, Edward T., Ex-'22; Moscow, Idaho. (U. S. Forest Ranger, Orofino, Idaho).

Newkirk, Edwin Ely, (R. C.) '16-'17, St. Louis, Mo. (Railway Mail Clerk).

Nonini, Amerigo Louis, (R. C.) '16-'17, Mackay, Idaho.

Parsons, Ralph Howard, Ex-'14, U. S. F. S., Coeur d'Alene, Idaho. (District Ranger).

Patrie, Carthon Roy, Plymouth, Wisc., U. S. Bureau of Plant Industry, Spokane, Wash., (Blister Rust Inspection).

Pederson, Arthur R., Ex-'22; Kootenai, Idaho.

Peterson, Raymond E., Ex-'24; Moravia, Ida.

Post, Claude H., Ex-'22.

Rae, Chas. Arthur, Ex-'14. Dentist—St. Maries, Idaho.

Ramsburg, G. F., Ex-'23; Weston, Va.

Redinger, Clyde Edison, Ex-'21; Adams Basin, New York.

Rettig, Edwin Claire, '19 B. S. (For.); Orofino, Idaho. (Clearwater Timber Protective Association).

Roeder, Charles, (R. C.), '20-'21; Streator, Ill. (High School, Moscow, Idaho).

Ruckweed, Fred John, '17 B. S. (For.), Plymouth, Wisc. 12-21-21 Gettysburg Pub. Schools, Gettysburg, S. D.

Russell, Raymond E., Ex-'22.

Rutledge, Walter T., Ex-'16; Nyssa, Oregon.

Salvin, Otis William, Ex-'19; Carmen, Idaho.

Schofield, Wm. Robert, '16 B. S. (For.); Chinook, Mont. (County Surveyor).

Schroeder, Bert H., Ex-'16; Cottonwood, Ida.

Shanner, Wm. W., Ex-'22.

Shipman, Orville H., (R. C.), '16-17; Boise, Idaho.

Sievers, Lawrence, (R. C.) '20-'21; Moscow, Idaho.

Slavins, Erwin Howard, Ex-'20; Spokane, Wn.

Smith, Harley Roscoe, Ex-'14.

Staples, Howard W., '20 B. S. (For.) Moscow, Idaho.

Stevens, Arthur W., '15 B. S. (For.); 1830 Sharp Ave., Spokane, Wash.

Stillinger, Chas. Roy, Special '19. U. S. Bureau of Plant Industry, Spokane, Wash.

Stone, Capt. Lawrence Fielding, Ex-'15. Commanding Officer, Arcadia Balloon School, Arcadia, Cal. (Home in Monrovia).

Storms, Willard Sidney, Ex-'23; Rupert, Ida.

Swan, Hugh Harris, Ex-'15; Sherbourne, N. Y.

Teed, Ryle, 428 P. O. Bldg., Portland, Oregon. (U. S. Forest Examiner).

Telford, Milton McKinley, Ex-'20; Coeur d'Alene, Idaho.

Thornton, James A., Ex-'12.

Throckmorton, Michael Reed, Ex-'24; Rupert, Idaho.

Oylear, Clarence H., Ex-'21; Middleton, Idaho.

Vick, Ernest Raymond, (R. C.) '19-'20; Watford City, N. D. (U. S. F. S., Luther, Mont.)

Wadsworth, Herbert A., '11 B. S. (For.) Maj., U. S. Inf., Fort Howard, Md.)

Walker, Everett Foster, Ex-'23; Moscow, Ida.

White, Albert C., (R. C.) '19-'20; Boise, Idaho., R. F. D. No. 1.

Williamson, Chas. Leonard, Ex-'14. (N. Western Mgr. for Powers Regulation Co., Chicago), 318 Alaska Bldg., Seattle, Wn.

Webster, Roy Russell, (R. C.) '15-'16; Post Falls, Idaho., (Rubedew Lumber Co.)

Welker, Leonard, (R. C.) '20-'21; New Holstein, Wisconsin.

Williams, John, (R. C.) '16-'17.

Wiseman, Claude C., Ex-'22; Middleton, Ida.

Wolfenden, William, Ex-'23; Gooding, Idaho.

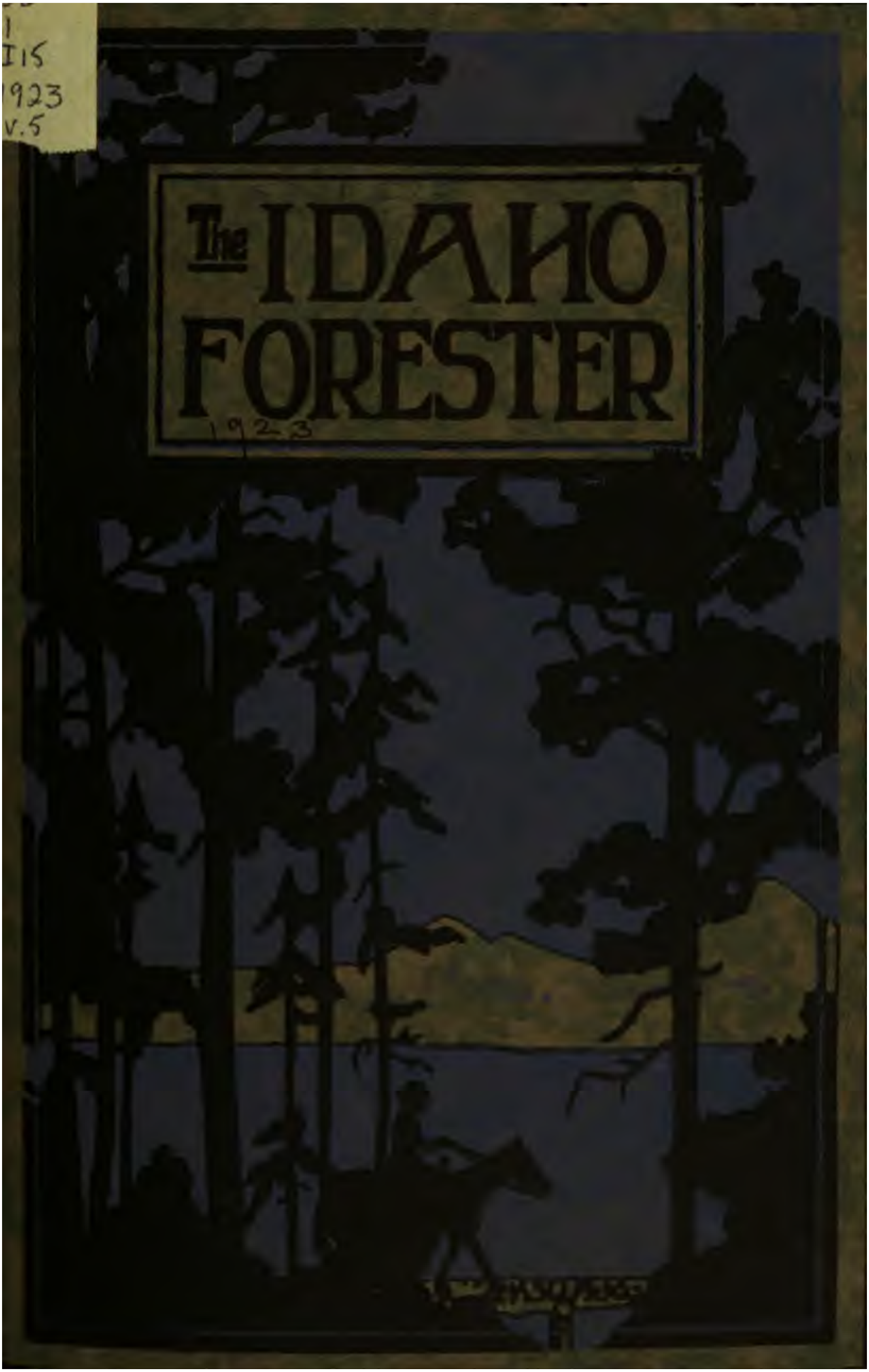
Yates, Donald, '17 B. S. (For.); Potlatch, Ida., (Land Dept., Potlatch Lumber Co.)

Youngs, Homer Smith, '17 B. S. (For.); Deceased.

A WORD OF APPRECIATION

The editors of THE IDAHO FORESTER wish to express their sincere appreciation of the kind assistance and cooperation on the part of contributors and advertisers which have made possible the publication of this booklet.

The Reputation of FAIRBANKS MORSE & CO. is WELL KNOWN.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CONTENTS

Dedicated to

WALTER D. HUMISTON

Assistant General Manager, Potlatch Lumber Company

who, by his ability, energy and vision, has proven a leader in the interests of forest conservation not only in Idaho but also in the entire Northwest.

FOREST TAXATION

By W. D. HUMISTON
Assistant General Manager, Potlatch Lumber Company

About fifty years ago a few people in the United States began to think and talk about "Timber Taxation." Some years later the inevitable result of the application of the General Property Tax System to forests was pointed out.

But in those days we knew little or nothing about any of the methods and theories of taxation which have since come into vogue, like the taxation of intangibles, choses in action, incomes, net profits, excess profits and inheritances. The general property tax was used almost exclusively as a means of producing the necessary revenues for states, counties and municipalities and, while it was freely admitted that it was not fair or equitable or good economics to tax a growing crop of timber each year for a hundred years or more, it was felt that taxes on timber were not then excessive or very burdensome. As a matter of fact, they were not. Twenty-five years ago the expenses of government were on a very moderate scale as compared with those of the present time so that the burden of a tax on timber which was unjust and uneconomic in theory and practice really had very little bearing on our timber supply or on its rate of depletion. Stumpage was cheap and our timber supply seemed inexhaustible.

Up to this time our forests have been exploited with little thought for the future. Nor must this charge be made against the lumbermen alone. Here in Idaho thousands of acres of fine timber have been cleared off for farms. My grandparents cleared a quarter section for a farm in southern Ohio and destroyed hundreds of thousands of feet of the choicest black walnut timber or made log barns and corn cribs and fence rails of it. Forest fires, which have been caused by human carelessness and often by men who had an utter disregard for the property or safety of others, have annually destroyed billions of feet of timber. But these conditions can not last much longer. Before many more years have passed we will be compelled to plant and protect trees and grow our timber-----or else import it at prices which will make any lumber prices we have heretofore seen pale into insignificance.

There are tremendous areas in the United States where there are stands of timber of valuable species which are now just under merchantable size. Many large areas on which logging is now being carried on have considerable stands of so-called "advance growth" which is just too small to be of commercial value at this time. If allowed to grow for a very few years longer, this timber, which is from twenty-five to seventy-five years on its way to full maturity, will defer our ultimate timber famine a good many years and will furnish the cheapest supply of timber the next generation will have.

But this young timber will never reach maturity unless protected from forest fires and attacks of fungi and insects. Such protection is very expensive, especially in northern Idaho, where fire protection costs will average ten cents an acre a year and have recently run as high as forty-two cents an acre. Such costs, plus necessary administrative expenses, plus the accummulated interest and inevitable losses, will make a charge against this timber which will be so high as to make private individuals and corporations very chary of such commitments of their funds if, in addition, the resulting crop and the land it is grown on is to be taxed each and every year until the timber is cut.

In discussing this phase of the taxation of timber, the Massachusetts Department of Conservation, Division of Forestry, recently said:

> "A crop of corn takes eighty days to mature. If the corn crop were taxed every day it would amount to the same burden on the owner as the present method of taxing forest land every year."

Probably the greatest trouble with the present method of taxing timber and timbered land is the fact that there is usually little or no income from the property itself with which to pay the costs of fire protection, administration and taxes.

The assessed valuation of timber and timbered land is usually determined in the most haphazard, unjust and inequitable way. In most instances the assessment is pure guess work. Political expediency is frequently of greater influence than considerations of jus-

tice and equity. It is quite common here in Idaho to find that, when a lumber company buys a timber claim, the assessed valuation is increased from one hundred to four hundred percent over what it was when the same tract was owned by an individual—especially if the owner was a resident voter in the county where the timber is located. In some of our counties practically the only land on the assessment rolls assessed as timbered land is that owned by corporations. Occasionally one can find a timbered tract belonging to a private individual assessed as such, but investigation nearly always develops the fact that the owner is a non-resident. Literally thousands of acres of good timber, owned by resident voters, are assessed year after year as Grazing Land, Cut-over and Burned Land, etc.—any classification which will take the tax burden off the shoulders of the voter-owner.

Probably not one corporation's petition in twenty for relief from such conditions is granted by our County Boards of Equalization, no matter how conclusive the evidence which is produced in support of the petition for relief.

The increases in tax levies for common schools, hard surfaced roads and many other purposes have been large and frequent during recent years and there seems to be no relief in sight.

Taxing Idaho's largest bodies of privately owned timber and the land it grows on year after year at a high assessed valuation, as compared with that of other classes of property, is bad enough, but, when the taxing authorities, boards of equalization and general public all conspire to saddle the maximum tax burden onto this class of property, it doesn't take a prophet or financier to see that exploitation of the timber will be as rapid as possible and that private reforestation, or even continued protection of "advance growth," will wait on the day when timber, timbered lands and lands which are reforesting are assessed and taxed more justly and on an entirely different basis than at present.

I have tried to outline in a rather broad general way what the matter is with our present system of forest taxation and how the general property tax system, as applied to this class of property, is further frequently complicated by ignorance, inefficiency and the deliberate intent of taxing officers and boards of equalization to tax the corporate timber owner every cent it will stand or can be made to pay.

Naturally, the question arises as to what are the alternatives and what the best methods of taxing privately owned timber, timbered lands and tracts which are reforesting.

This question has been very seriously considered for a number of years by some of the best minds in the country. In the spring of 1908 President Roosevelt appointed the National Conservation Commission and Fred Rogers Fairchild, Professor of Political Economy in Yale University, was appointed Chairman of the Committee on Forest Taxation. With the assistance of the United States Forest Service a large amount of material was collected and the problem was clearly defined and carefully studied.

The same year the National Tax Association, the membership of which is made up almost entirely of members of State Tax Commissions, Professors of Political Economy of many of our largest Universities and students of taxation and economics, took up the study of Forest Taxation. Professor Fairchild read a paper on the subject at the Toronto Conference of the National Tax Association in October 1908. Mr. A. C. Shaw, Principal Examiner of the United States Forest Service and Dean B. E. Fernow, of the Faculty of Forestry, University of Toronto, also presented papers on this subject at the same conference. So 1908 is really a very important year in the annals of reform in Forest Taxation. While Professor Fairchild, Mr. Shaw and Dean Fernow each approached the problem from different angles, they all agreed that a crop of timber and the land it is grown on should not be taxed every year at full rates for the entire period that the crop is maturing.

The Toronto Conference of the National Tax Association and the National Conservation Commission seem to have done more to focus attention on the problem of proper Forest Taxation than had been accomplished previously by the combined efforts of everyone who had studied and discussed Forest Taxation.

Professor Fairchild has remained as Chairman of the Committee on Forest Taxation of the National Tax Association continously, I believe, since 1908 and his committee has made several reports, notably that delivered at the Minneapolis Conference last fall.

In April 1910, Governor M. E. Hay, of Washington, appointed a Commission on Forest Legislation to consider and report upon needs for legislation in relation to the forests of

the State, handling of forest products, the logged-off land problem, reforestation and forest taxation. At the first meeting of the Commission Professor F. G. Miller, then of The School of Forestry of the University of Washington, now Dean of the School of Forestry of the University of Idaho, was unanimously elected Chairman of the Committee on Forest Taxation.

The Commission made its report and recommendations to the Governor in November 1910. The entire report is well worth reading, even after nearly thirteen years have elapsed since its publication, but that part of the report which covers Forest Taxation, and which I have good reason to believe was written in its entirety by Dean Miller, stands as a classic and it is unquestionably one of the best things that has ever been written on the subject. All students of taxation, and particularly of Forest Taxation, should read this report carefully .

In 1921 the Legislature of Oregon directed Governor B. W. Olcott to appoint a committee of seven to gather information, formulate recommendations, prepare proposed legislation and report to the Governor upon public revenues and the feasibility of raising revenues from other sources than those theretofore used.

Governor Olcott appointed a strong and thoroughly representative committee, including Colonel C. S. Chapman, Forester of the Western Forestry and Conservation Association. The Committee impressed into service as advisers Dr. James H. Gilbert, Professor of Economics of the University of Oregon, and Dr. Hector Macpherson, Professor of Economics and Sociology of the Oregon Agricultural College.

The report to the Governor was presented last December just prior to the convening of the Oregon Legislature. It is very comprehensive and has been so carefully prepared and presented and covers the subject so throughly that it might well be used as a text book. Those parts of the report covering the taxation of forests, cut-over land and land which is reforesting bear all the ear-marks of having been written by Colonel Chapman and are especially interesting to students of Forest Taxation.

It will be seen that some of the best minds in the country have been studying the problem of Forest Taxation and collateral subjects intensively and systematically since 1908. At intervals of a few years a contribution of outstanding merit and importance has been brought out. With Dean Miller's report of 1910, the report of the Committee on Forest Taxation to the National Tax Association at Minneapolis last year, and with the recent report of the Oregon Committee on Tax Investigation, we have what seems to me to be the last word on this important subject.

So far as I have been able to ascertain everyone who has ever given the subject of Forest Taxation any study agrees that immature timber can not stand to be taxed under the General Property Tax System every year it is growing and until it is cut. When the land on which the timber is growing is also taxed each year, the situation is made just that much worse.

Writers on Forest Taxation generally divide the subject into separate problems: (a) the taxation of immature forests; and (b) the taxation of mature forests. The taxation of mature forests should be further subdivided so as to separate the mature forest which is accessible and can be logged at any time, as far as location is concerned, from the mature forest which is inaccessible and, therefore, could not be logged under any circumstances until it is reached by the development of transportation facilities.

As to the proper method of taxing immature growing timber Dean Miller's Committee recommended in 1910 that "the State should exempt both the land and the growing crop from taxation till the timber is cut---- the accumulated tax on both then to be assessed against the timber."

Professor Fairchild's Committee recommended last fall that:

"(1) The Law shall provide criteria for determining what is "mature timber."

(2) All trees other than mature timber shall be exempt from taxation, and in assessing land no account should be taken of the value of any trees except mature timber. Forest lands shall be assessed no higher than similar bare lands in the neighborhood.

(3) All forest products (with the exception of certain small quantities taken by the owner or the tenant for his own use) shall be subject to a yield tax at a rate corresponding to the business tax on other businesses. The rate would perhaps ordinarily be in the neighborhood of 5 per cent. The yield tax should be administered by

state officers, and the proceeds distributed to the towns or counties.

(4) It is assumed that if there is an individual income tax, forest incomes will be treated exactly like other incomes."

The Oregon Committee on Tax Investigation recommended the passage of a law which would provide that cut-over or burned-over land or any forest land on which there is young or "advance" timber growth which meets the requirements of the State Forester may, at the option of the owner, be classified as "Reforestation Land." There would be no time limit for such classification until the timber reaches maturity, and so long as the owner complies with the forest fire and forest patrol laws of the State.

When the State Forester has classified any land as Reforestation Land and so certified to the County Assessor "said land and the forest growth then or thereafter thereon shall be separated for taxation purposes as long as said classification continues. The Assessor when making the annual assessment shall assess only the value of the land alone, not enhanced by reason of forest growth thereon, and upon no higher basis than the minimum rate at which he assesses wild and unforested land of the same character not separately classified under this act." Of course the prevailing rate of tax levied against all other classes of property would then be levied against such Reforestation Land,

As to the method of taxing mature timber Dean Miller's Committee found that "a change in the method of taxation which would lay an annual tax on the land, and a yield tax on the timber when it is cut, would be highly to the interests of the State as a whole, in that it would aid distinctly in perpetuating the forest as a resource."

Professor Fairchild's Committee's last report says regarding the assessment and taxation of mature timber:

"The mature forest presents quite another problem. We are here dealing with a full grown product. Two cases appear, depending primarily on whether the timber is actually marketable or not. By marketable timber we mean mature timber which is accessible and so located, with respect to market and transportation facilities, that its immediate marketing is possible. Whether it actually is being marketed depends upon the owner's judgment as to the most favorable time. There is nothing in the theory of the property tax to affect adversely marketable mature timber. A property tax fairly drawn and administered with even-handed justice upon all owners of taxable property would give the owner of such mature timber no ground for complaint. Of course the obvious rejoinder is: 'there ain't no such animal.' This ideally perfect property tax exists only in the imagination. The real property tax, as we know it, is badly drawn and more badly administered. Its application is unequal and unjust. If forests of marketable mature timber are taxed more heavily in proportion to their true value than other classes of wealth, the forest owners have a grievance, but it is in no way different from the grievance of any other property owner, under similar treatment.

"On the other hand, when timber is so located that its present marketing is not possible, the situation is in theory similar to that of the growing forest. We have here a form of capital whose income is deferred to the more or less distant future. It is true that the timber is mature, but if other causes beyond the owner's control defer its marketing, the result is the same. It is the fact of the necessarily deferred income, rather than the particular cause of that fact, which makes the annual tax on capital value work injustice. The reasoning in support of this conclusion has been presented heretofore in other reports by the chairman. There are in certain parts of the United States large forest areas containing mature timber whose location is so inaccessible or so remote from markets or transportation facilities that its marketing is now and may long continue to be a physical impossibility. To collect from such forest capital an annual property tax, assessed upon the true value from year to year, places an excessive burden upon the owners. This result is inherent in the nature of the property tax and not (as in the case of marketable timber) due to faulty wording or administration of the law. * * * *

"In seeking a solution your committee starts with these principles: (1) Mature timber should be taxed so far as is equitable and possible on a par with other wealth and business. (2) If there is an individual income tax, it should relate to forest income the same as any other income. (3) Where there is a special business tax, it should take the form of a yield tax for forest enterprise. These principles are the

same as have been recommended for growing forests and their discussion in that section applies generally here. (4) The property tax as applied to marketable mature forests should be the equivalent of an annual tax upon the land and trees, assessed in the same ratio to true value as prevails for other taxable property in general, and at the same rates as are applied to other wealth. (5) The property tax, when applied to forests of mature timber which will not be marketable till some time in the future, should take account of the fact of deferred income. * * * * *

"From the point of view of the forest owner, the most favorable solution would probably be the pure yield tax, but the pure yield tax will not do, for two reasons at least. (1) The owner of marketable mature timber, who chooses to hold it uncut, for sale in the distant future or as a pleasure park or hunting ground, must not be permitted thus to postpone his tax contribution indefinitely or avoid it altogether. (2) The resulting irregularity of public revenue would be a serious matter, especially in those localities where virgin timber composes a large part of the taxable wealth, these being the very communities where the problem of the taxation of mature timber is most acute. As has been observed heretofore in this report, there are ways of adjusting this irregularity of revenue, but nevertheless the public appears unwilling to take the chance. There are other serious difficulties, both theoretical and practical. We are quite safe in concluding that the pure yield tax is not the solution. * * *

"Taking everything into consideration, your committee is of the opinion that the only practicable solution of the problem of taxing the mature forests is to seek to make the property tax as equitable and convenient as may be. In particular every effort should be made to insure a fair assessment of forest property. This means not only an accurate valuation; it requires also that the assessed value of forest property shall not bear a higher ratio to its true value than the prevailing ratio of assessed valuation to true value of all taxable property. Assessment at the hands of a state officer or board would doubtless assure uniformity and certainty in the assessments. There is always the danger however, that such efficient assessment, by arriving at the true value of forest property, will unjustly burden such property, as compared with other property not so efficiently assessed. Equality in taxation must be real equality, not merely formal.

It is admitted that this solution is more favorable to the forest of marketable timber than to that which is for the present not marketable. But the committee has thus far been unable to discover a practicable means of reconciling this discrepancy."

The Report of the Committee on Tax Investigation of Oregon says:

"A survey of the situation in this state leads to the conclusion that mature forests must continue to be assessed and taxed under the general property tax, The great outstanding reasons for this are that many counties are largely dependent for revenue on taxes secured from timber properties. To make any change at this time in line with modern thought in forest taxation would work hardship on timber counties where little exploitation is going forward. From the standpoint of the taxpayer, complicated adjustments would also be necessary as most timber has been paying taxes for a long period and in some localities very heavy taxes have been the rule the past decade. Any yield tax basis would of necessity be obliged to recognize what has taken place in the past and would lead to complicated cases involving heavy administrative costs. That taxation of mature timber presents a distinct and difficult problem is borne out by a recent report of the committee on forest taxation of the National Tax Association. Professor Fred R. Fairchild, an economist of recognized standing is chairman of this committee. * * * * "

The report then quotes at considerable length from the Fairchild report which it evidently approves.

From the foregoing it will be seen that there is agreement between different authorities as to the necessity for reform in the method and basis of forest taxation, especially as to land which is reforesting. While the specific recommendations vary somewhat, the broad underlying principles are much the same.

Two great obstacles stand in the way of reform in forest taxation, however. One is the fact that in Idaho, as well as in all of the other northwestern states, a Constitutional Amendment would be required before it would be possible to assess and tax timber and reforesting lands on any basis other than that

which applies on other classes of real property. Constitutional Amendments are always difficult to pass and one relieving timber of any taxes, or even deferring the time when taxes on growing timber would be collected could not possibly pass until the general public had been very fully informed of the necessities and exigencies of the situation. The other obstacle is the fact that many counties and all of our northwestern states derive such a large share of their incomes from timbered lands that any change in the time of collecting such taxes which would postpone the collection for a term of years would seriously disarrange their finances.

Lumber operations on a large scale were begun in Idaho twenty years too soon, for our Idaho mills have been at such a disadvantage when compared with the advantages of cheap labor, long hours of work and low freight rates enjoyed by southern lumbermen and ocean transportation, foreign markets and the comparatively cheap logging on the heavily timbered tracts of the Coast operators, that most of the time during the last two decades our local mills have just broken even or else have operated at a loss.

From now on, however, I look to see better times for our Idaho lumbermen and considerable development in this State. This means that the time is not now far distant when tax reform, as applied to cut-over and reforesting land at least, must come or Idaho will lose an annual payroll of $10,500,000.00, as well as the $2,000,000.00 which is paid by the lumbermen every year to resident farmers for agricultural products and we shall have a great many ills to contend with that we know nothing of now.

If we settle the tax problem right and soon and keep forest fires out of our growing timber, Idaho can have a supply of timber sufficient for its own needs for all time, with a very substantial surplus left over for sale in the eastern markets.

THE RANGER SPEAKS

Have you followed the trail winding upward
From canyon and forest to peaks
From the cool, sweating damps of the cedar
To sky-lofts the bald eagle seeks?

Has your back felt the weight of a pack-sack
Have your mocassined feet felt the trail
With its smoothly-worn stone, root, and windthrow-
With its barren of loose shifting shale?

Have you fashioned a cup of white birch-bark
To drink from the bubbling spring-
Have you prayed for a swallow of water
Where the dying sparks floated to cling?

Have you battled for life in a blizzard
And fallen exhausted to earth—
Have you kindled a fire 'neath the rock-ledge
Or suffered while death grinned in mirth?

Have you carved with your hand from the forest
A cabin of moss, log, and stone,
And wrested your food from sly nature?
Have you lived for long weeks all alone?

Have you pitted your highly-trained reason
With instinct that God gave the wild?
In the presence of His great creations
Have you felt you were only a child?

Oh, friend, if you haven't lived these things
Do you stand among those of the mass
Who fear meeting life single-handed
Lest they fall 'neath the elements' lash?

Stanley Foss Bartlett.

THE PRACTICE OF FORESTRY ON THE COEUR d'ALENE NATIONAL FOREST

By C. K. McHARG
Forest Supervisor, Coeur d'Alene, Idaho

After about 17 years of forest administration on the Coeur d'Alene National Forest, during which time many fires have burned and many sales of timber have been made, the question naturally arises---"Is forestry being practiced?" The answer is decidedly---"Yes." There are well formulated plans in effect, both for amount and distribution of cut; continuous production is a fact—for it is known what the life of the present mature stands will be—a high standard of slash disposal is carried out, and natural reproduction follows lumbering; and it may be expected that the cut a hundred years from now will be increased over that which is possible at present as a result of a practicable form of regulation.

Resources of the Forest

The Coeur d'Alene National Forest has been very richly endowed. The fires of 1889 and 1910 were a severe setback and unquestionably the allowable annual cut has been reduced, as a result, between 30 million and 40 million board feet. (Just how much can only be approximated for a complete inventory of the losses of those years could not be made.) It is safe to believe that a cut sufficient for one double band mill was lost to the present rotation. In spite of these disastrous years, which stand out above all others, there still remains a fine stand of timber, for this rotation, which fortunately is largely accessible. These two factors, a large volume of readily marketable timber and its accessibility, make intensive forest management possible and entirely practicable.

A look at the map will show the accessibility factor. Coeur d'Alene Lake is the center of milling activity for this part of the Inland Empire. The Coeur d'Alene River, entering the Lake from the east, forks at Enaville and again at Linfor. The Forest is divided thus topographically into four natural divisions: (1) The direct drainage into the Lake and main River, (2) The South Fork Drainage, (3) The Little North Fork Drainage, and (4) The North Fork Drainage. A fifth division is sometimes recognized, the drainage into Hayden Lake, but for all practical purposes this is considered as a part of No. 3. All of these main forks and many of their tributaries of the Coeur d'Alene River are drivable streams. They penetrate to the farther bodies of timber. The bulk of the timber supply lies in the drainages of the North Fork and the Little North Fork. In addition to the drivable streams, railroads extend from Coeur d'Alene Lake to the Montana divide and up the North Fork for nearly 30 miles. While the greatest part of the timber cut has heretofore been transported by water, there is an increasing tendency to use the existing railroads and several extensions are being proposed.

The total stand of merchantable sized timber, all species considered is, in round numbers, four billion feet. This includes all types and stands 60 years old and over. White pine is nearly 40 percent of the total merchantable stand, the other principal species being white fir and hemlock, larch and Douglas fir, cedar, spruce, lodgepole and yellow pine.

The most recent compilation, based on timber surveys up to 1923 and special examinations made by members of the force shows the distribution of age classes as follows:

DISTRIBUTION OF AGE CLASSES

Age Class	0-20	20-40	40-60	60-80	80-100	100-120	120+	All Aged	Total
Acres	174,000	61,000	13,000	54,000	34,000	26,000	189,000	1000	552,000

The gross area of the Forest is approximately 790,000 acres of which about 128,000 acres are alienated. The remaining area of 662,000 acres is National Forest land. The total area of all age classes, as shown above, 552,000 acres leaves a balance of 110,000 acres which

is non-producing. This is divided between barren ground, sub-alpine type, and double burns which must be planted to be productive. This area is not considered at the present as timber producing, though eventually part of it may become so.

Working Circles for Sustained Yield

After establishing the inventory and distribution of the resources the next step has been to consider the question of maintaining industry continuously. The Forest Service has stood by the principle that permanency in industry is fundamental to the nation's welfare. Just how intensively this principle should be applied has been given considerable thought. Three propositions appear possible; (1) to establish a working circle composed of a group of National Forests having a common, logical milling center, in which logging would proceed through the mature timber at a constant rate of cut, though one or more Forests of the group might be without any logging over a period of years. The conception of a working circle is, an area of greater or less extent in which sustained yield and continuous production are maintained, though in individual subdivisions there may be a suspension of activities. (2) To establish a working circle composed of one National Forest only. (3) To subdivide one National Forest into several working circles, based on natural dividing lines, in each of which sustained yield and cutting operations are maintained.

The first does not apply in well developed regions. The second does not satisfy the desires of the Forest Service, since it would permit a concentration of the entire allowable cut in one drainage after the completion of which the drainage might stand for half a rotation period or more with no activity and a consequent loss of logging improvements and a serious reduction in the available fire suppression facilities. The third, applied with reasonable latitude, permits continuous activity in each major Forest division, and, where applicable, fosters the development of permanent or nearly permanent communities.

The last is the one accepted for the Coeur d'Alene National Forest and, while applied broadly, it permits a permanent logging improvement plan in each of the large divisions. Two working circles only are considered, the division being based upon the territory tributary to the major transportation facilities. The drainages of Hayden and Coeur d'Alene Lakes direct, the Little North Fork, that part of the upper North Fork which is tributary to the proposed logging railroad extending east from Hayden Lake and the main Coeur d'Alene River, constitute one working circle. The other includes the North and South Forks of the Coeur d'Alene River.

With the data at hand covering the volume of timber available, the distribution of age classes and the division of the Forest into working circles, it has been possible to proceed with the formulation of a Forest Management and Cutting Plan. The problem in Forest Management is then, first, to determine a limitation of cut by working circles in the mature age classes which will permit continuous cutting over a sufficient period to bring successively the 100 to 120, the 80 to 100 and the 60 to 80 year age classes to maturity, taking into account at the same time the age classes under 60 years old which should also be brought to maturity without a diminution in the cut; and, second, to so conduct cutting operations that reproduction will follow with certainty with the more productive and valuable species well represented in the new stand and that the added fire risk may be held to a minimum.

Regulation of the Cut

The first part of the problem is not to be solved by the application of European formulae methods. On no extensive area is the available data sufficiently intensive to justify careful mathematics. The mature timber is in virgin stands, which vary in composition and volume on almost every acre. After several attempts to apply formulae without great satisfaction, (though the results were surprisingly good), the method which appeared most consistent with the problem was the very practical and simple one which follows:

For each working circle the area of each age class under 60 years by types was listed. From actual figures of yield per acre and estimates of standing timber, by types, an average volume per acre at maturity was determined. It may be designated as an empirical estimate of volume at maturity. This assumed yield was applied to the age class area list from which computation was derived a conservative estimate of what the younger age classes will produce when the time comes to harvest. It was thus known when and how much timber would be available from the age classes now below merchantable size.

The next step was to list by working circles the known logging chances containing

merchantable timber, giving for each the estimate, the volume deductions for seed trees, etc., and the period of cut at several assumed rates. The rate of cut selected was the one which, when applied first to the present mature timber and next to the successive age classes down to 60 years old, will permit the bridging of the gap between the older and younger age classes. The results of these investigations show that a cut of 20 million feet a year in one working circle and 30 million in the other is justified and these rates may be continued through the present rotation.

Problem of Inferior Species

Because of the low market value of mixed species of timber, a serious difficulty is encountered in the application of a forest management plan. White fir, hemlock, larch and Douglas fir are all more or less difficult to market, except in limited quantities. The Coeur d'Alene mines absorbed some larch and Douglas fir, about 12 million feet being used in the year 1922, but as lumber only limited quantities can be used. White fir is gradually becoming established to a point where it can be handled without great loss. Hemlock is practically unmarketable as lumber. This condition must be taken into account in sales. White fir and hemlock, because of silvical characteristics, are a detriment to the new stand if not removed from the stand when the white pine is logged, their heavy foliage so shading the ground as to prevent the development of white pine seedlings. These species are also frequently very defective in mature stands, which is an added problem in management. Larch and Douglas fir can be left in greater quantities in an area being cut without serious effect.

To meet this problem a careful study covering a number of years was carried on and the policy decided upon as a result appears to have approached a solution. It will be more nearly solved when the major transportation facilities already planned have been established. For the next 20 years, or until market conditions are such that mixed species can be logged at a profit, logging chances will be blocked out on the basis of about 80 per cent white pine and 20 per cent mixed. Where there is insufficient white pine to maintain about this ratio a logging chance will be left intact for cutting at a later period. On large sale areas certain parts, even down to a few acres where the percentage of mixed timber is high, will be blocked out and excluded from the sale. In other words the practice will be to leave intact all areas which cannot be practicably cut and left in a satisfactory silvicultural condition.

Forest Sanitation

In the over mature stands where the hemlock and white fir are very defective extensive sanitation measures are necessary. These measures must be so applied as to reconcile the factors of fire hazard and suitable conditions for reproduction. Badly defective trees of these species are usually altogether unmerchantable. At the same time they shade the ground to such an extent that white pine seedlings will not develop under them, particularly on the north slopes where they are most common. If these trees are killed by girdling the white pine seedlings develop excellently as shown on areas cut over about 1916 but the fire hazard resulting from these dead trees, each of which produces much inflammable material, might reach a disastrous point. A compromise between these two factors is reached in the latest policy which has recently been decided upon. Defective trees up to about fourteen inches D. B. H. will be felled and the tops and limbs lopped, piled and burned. Trees larger than this figure will be girdled and left standing up to twelve trees per acre. Large trees in excess of twelve per acre will be felled as in the case of the smaller trees. Some variations of this practice will no doubt be followed. Along transportation routes where fire risk is heavy no girdled trees will be left standing and if the aesthetic factor is prominent even defective trees, which frequently are no less beautiful than sound trees, will be left green. In no case will sound and thrifty young trees be destroyed nor will merchantable material be wasted.

The cost of santitation measures is charged against the present stand of timber even though it is largely for the benefit of the timber in the next rotation. It is part of the obligation to leave cut over areas in the best possible productive condition. At the time of appraisal the cost of this work is estimated as in the case of any logging cost and it is included as a cost of the operation.

Slash Disposal

Since the Coeur d'Alene National Forest has been under administration about 400 million feet of timber have been cut under sales. This cut has been sufficient basis to determine the most effective and practicable methods for the disposal of slash in the white pine type of north Idaho. The object of slash disposal is

A CONTRAST IN SLASH DISPOSAL

Cutting Area in Western White Pine, where slash has been piled and burned—Young trees preserved, fire hazard effectively reduced.

Effect of broadcast burning of Logging Slash in Western White Pine. All living trees killed. The fire hazard will be worse than before the burn in a few years when these trees blow down and weeds come in.

primarily for a reduction of fire hazard after logging. The establishment of a satisfactory new stand of timber is perhaps secondary, though fortunately it is incidental. Without question the system known as "piling and burning" is most effective in attaining the object. That it is practicable is proved by the fact that the high Forest Service Standard costs now only about 3 1-2 percent of the value of white pine logs delivered in driving water.

Slash piling is carried on during all seasons of the year, except in the period of heavy snow, or from about December 1 to April 15. All material up to 4 inches in diameter is piled in compact piles well separated from each other. Normally from 20 to 25 percent of the ground area is covered by slash piles. The foreman ordinarily drives a long stake to mark the location of piles. The laborers then pile the slash around the stake. The difficulties on steep ground will easily be recognized. The piles average perhaps 4 to 8 feet in diameter and 3 to 5 feet in height.

Slash burning must be accomplished within a very limited period. Rarely indeed will the slash burn until the snow goes, which is usually in April. All burning must be stopped by June 1, since "hang overs" will be apt to occur later, causing fires. The fall burning cannot be started until the seasonal rains occur, usually the second week in September. The period extends to about November 15, when the moisture conditions make burning very expensive. In the average year the burning period amounts to a total of about 3 1-2 months, little enough time to burn the slash from 50 million feet. This period is frequently shortened by an October too dry to burn safely or too wet to burn at all.

Modifications of this system are carried on at times. "Progressive burning" is used to advantage in some cases. This process is simply one of starting a series of fires during the wet season and piling the green slash directly on the fire. In some overmature stands, which have been cut clean, a controlled broadcast burn is used. Here the slash is handled only enough to separate the windrows and burned. This is practiced only on flats and to a very limited extent. It is not used where any young timber is left.

The costs of piling and burning slash vary, of course, with the wage scale. Current costs are in the neighborhood of 85c per M on the timber cut.

The results of continued piling and burning cannot be questioned. The fire risk is greater of course than in an uncut timber stand, but it is reduced to a point where it is possible to successfully fight a fire once started. It is interesting to look down from a high point overlooking a sale area which has been logged and the slash piled and burned. Unless the eye is experienced it is difficult to detect that any timber has been removed.

Planting

This brief sketch of how forestry is being practiced in a north Idaho National Forest is perhaps not complete without a statement concerning artificial reforestation. Ordinarily, the operation of cutting is followed by natural reproduction. However, some tracts which have been visited by disastrous fires two or more times do not come back to a forest type, or the return will necessarily be so delayed that planting is justified. Where the 1910 fires burned in very young stands and in some cases in very old stands, natural reproduction has not followed. In some other places the 1910 burn was reburned in 1919 and here also the new forest has not started. Plantations have been started on an extensive scale to bring back the land to a producing state. It is planned to plant the non-producing white pine type within about 20 years. At the present time a project of about 14,000 acres is under way on the east fork of the Coeur d'Alene River near the Montana divide. Large areas near Wallace have already been planted since 1912. The results of planting are on the whole satisfactory, though there have been certain failures due to the long dry summers of recent years, which the young seedlings could not withstand. Some plantations show as high as 85 per cent survival. On the whole the average indicated that about 100 planted trees per acre have survived.

That forestry is possible as a governmental or other public project in America, is a fact. The Coeur d'Alene National Forest is now paying its way. Even permitting the permanent improvement expenditures to be charged as costs the returns in actual funds are in excess of the costs.

PUBLIC RELATIONS IN FORESTRY

By THEODORE SHOEMAKER
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Success in any large undertaking depends on public opinion. Opinion can only come from knowledge and knowledge from interest. A large part of the people of the United States are not interested in Forestry. They therefore have little knowledge of it or its importance and give it practically no support. Yet forestry is a large undertaking and concerns everybody. In order to succeed it must have a public sentiment that is both general and favorable.

In thus stating the case it is not my purpose to cry "Wolf, Wolf!", but only to face the issue and admit the facts at they are. The situation might be better, and it might be a great deal worse. When all the facts are boiled down the one big fact that stands out is that while considerable progress has been made in building up public sentiment it has been too slow. The pressure for improved practices in the protection and cutting of our forests has not been strong enough, and as a result those practices have not grown fast enough to prevent a serious timber shortage. Already this shortage is keenly felt in many regions where timber was once plentiful, and if we keep on our present course it is but a question of time till it will be felt nationally.

That the federal government has foreseen the danger and has created the National Forests, which it is managing on a permanent basis does not solve the problem, as so many people think it does, because the National Forests, even under the best of management, are capable of producing but a small part of the timber needs of the country. Besides, even on the National Forests, fire control and reforestation are still not on an entirely adequate basis, due to lack of funds. Congress has been slow to increase appropriations or to add more timberlands to the National Forests, showing the lack of a general understanding of the need for it. The States are not doing as much on the whole, compared to the importance of the question, as they should. Private owners are generally either indifferent or else, because of risks, taxation and other burdens, are unable to handle their timber lands with regard to future production. With some exceptions they have not even adopted methods that will insure any kind of a stand after cutting. In a word the public is dormant on the forest question,

The task of foresters is nothing more nor less than to make the forests of the country continue to supply our needs for forest products. We must speed up if we are going to accomplish that task. It is not enough that we learn technical forestry, so that we can simply do our jobs in handling the public forests or in private employ. We must take up as well a part in building a public sentiment that will make forestry on an adequate scale possible. It is no use to prepare ourselves in a profession or trade in which there is no demand for our services. The Government and the States can not hire foresters unless the Congress and the legislatures appropriate money for that purpose. That will not be done except under pressure of public sentiment.

Let us look the question squarely in the face. Whose business is it that our forests are being destroyed, and who is responsible for bringing about a condition of the public mind that will correct those tendencies and practices that are so rapidly bringing about forest depletion? Everything depends on honest answers to these questions. It is the point of beginning, and until we find those answers we shall not even be able to marshall our forces and set about intelligently the accomplishment of that job. That is what I mean by facing the issue.

The answer to the first question is that it is everybody's business, which so often is equivalent to saying it is nobody's business. What happens to our forests concerns every individual citizen. This must be understood. Belief in this fact and willingness to launch out on it are fundamental qualifications of the man who would try to interest the public in forestry. How can we hope to interest people in what does not concern their welfare? It cannot be done. Scarcity of timber affects the price of rent and of almost every item of food or clothing. Once the public is made to see it in that light we shall have their interest, and an adequate forest policy will spring into existence.

In answer to the second question, there may be some disagreement as to who is respon-

sible for bringing about a state of the public mind that will correct our forestry wrong-doings. Here again, and particularly, let us be honest and fearless in our answer. It may help if we consider who, indeed, can interest and instruct the public in matters pertaining to forests. Viewed in this light it seems to me the answer becomes obvious. Only those who know can teach. Any person who does not see what forests mean to individual and community welfare cannot hope to show it to others. If he does see it, and if he does recognize that public sentiment is necessary, he cannot well dodge his responsibility. On whom, then, does this place the duty of building public sentiment? On foresters. In saying this I use the term in its broadest sense to include not only technical foresters and men of the State and Federal Forest Service, but all who know our forestry needs regardless of what line of training, experience or business that knowledge has reached them through.

As a measure for determining personal accountability I suggest you have only to ask yourself whether you are among those who understand the forest problem. If you do not understand and are employed as a forester it is your duty to learn. Surely that will be conceded, for no one can be a true forester who does not teach it.

In order to be a little more specific, let us list those classes of individuals having knowledge of what forests mean. They are (1) foresters; (2) forestry employees who are not trained foresters; (3) instructors of forestry; (4) teachers; (5) editors, journalists and authors; (6) members of sportmen's and other outdoor clubs; (7) timber land owners; (8) users of forest resources; (9) naturalists, scientists, economists, etc.; (10) County, State and Federal officers; (11) other interested and informed persons.

Mature Western White Pine Timber

That is quite an imposing list, but it must be remembered that not all are working at the problem. Not all trained foresters even may be depended on. The same is true of members of the Forest Service, some are

actually doing very little because they do not see this side of their jobs. I doubt whether this phase of forestry is stressed as much as it should be in the forest schools of the country, indeed, whether there are not some instructors who have not thought of teaching it as they teach silvics and mensuration. Certainly it is not as well understood as it should be by teachers of agriculture, geography, civics, economics, and other subjects to which forestry bears such close relation. Comparatively few of the newspaper and magazine editors and journalists of the country see it as something they should give active support to. The same applies to naturalists, scientists, economists and teachers. Timberland owners, outdoor people and recreationists are more alert and active because they are more directly dependent on forests for the things they are doing. Here and there also are individuals without regard to business or professional interest, persons of ability and influence, who have become deeply interested and are doing a great deal. They are persons of vision, who see and understand the meaning of forest depletion, and who, with fine public spirit, are assuming the duty of telling others.

Taking it all in all our forces are widely scattered, variously trained and loosely organized. Leadership and co-ordination of effort are needed, but under that leadership and coordination there must be a thorough individual knowledge of the importance of the problem, and a deep sense of individual responsibility for helping to solve it. That is the great need.

From any standpoint it seems to me public relations work should begin at home. We need to sell forestry to foresters and to those whose business is directly connected with the things of the forest, and we need to sell it to them in a way that will start them out to sell it to the general public, which, though not so patently, is nevertheless vitally concerned.

Now if it be admitted that what happens to our forests concerns everybody, and that those who understand the problem are responsible for creating the public sentiment necessary to save the situation, and if it be further admitted that our present course is wrong, then we are ready to consider what should be done, and how to go about it. If the forests are to be kept sufficiently productive we must stop doing some of the things we have been doing and we must begin doing some other things we have not been doing. Also some of the things we have been trying to do must be done more effectively. Most of these things can be included under a few main heads as follows:

(1) Better results in fire prevention.

(2) Determination of permanent forest lands and the adoption of methods of cutting and logging that will keep them productive.

(3) Stop waste in the cutting and manufacture of timber.

(4) Increase the utility of wood thru preservative treatment and thru the application of scientific knowledge of its characteristics and fitness for various uses.

(5) Reforestation and afforestation of waste land suitable for timber growing.

The accomplishment of these things is to a considerable extent a matter of extending operations that are already in use, but in other cases it means quitting certain things and taking up new ones. It would be interesting to consider these real forest problems in detail, but that does not properly come under this discussion. It will be pertinent to say, however, that the solution thru research and scientific investigation by which the public can be shown what is wrong and how it can be righted is of the very greatest value in Public Relations work.

In considering the means at our disposal for interesting the public, we should remember that these things have already been quite largely determined by much research and demonstration work, and the results constitute the best kind of materials and arguments to use. For example, the principles underlying fire control and the necessary machinery are pretty well known; the same is true of the reforestation work, management of cutting, etc. Perfections in these methods will come with their application on an extensive scale, of course, still they are now ready for use, and their extensive use would cure our forest ailments. But before they can be used they must be sold, and here is the crux of the problem. We have been growing or manufacturing some fine goods, but we still have too much of them on hand. Our salesmanship has not kept pace with our plant production. We have a product the public needs but we have neither convinced them they need it nor proved to them that the goods are right. Salesmanship! That is the public relations side of forestry, and I have come to consider it of equal importance to all the

steps in manufacture put together. We feel that our goods are right and that is the best kind of foundation for selling arguments, but we must also have a selling organization and we must put punch and system into our methods.

Two ways are open. One is thru education to secure voluntary adoption of good forestry practice. The other is thru the enactment and enforcement of laws to require it. The latter must come thru education also. A good deal has been done by the former method, and certainly as much as possible ought to be done that way. No opportunity should be lost to show owners of timber how to make good forest management pay. It would pay in many places where owners do not now see it. But even at best much will be left to law enforcement, involving assumption of costs, at least in part, by Government. The same principle holds here for it involves taxation, and people will not tax themselves for forest protection unless they can see that it will pay. That is why they build roads and schools, cultivate their land more intensively, or breed better stock, and that is why they will take up an adequate forest policy some time.

But there are differences which in some measure handicap our efforts. One of these is the long-time nature of the problem. If we build a road we can start right in using it, if we buy better dairy cows there is immediate return in the cream check, or if we put fertilizer on the soil it reflects benefit in this year's crop, but if we plant a tract to timber or invest money in saving a patch of seedlings from fire the benefits are much farther removed and much less tangible. To me this seems a real obstacle and one that requires our best thought to remove. If a man tried to sell you a house or an automobile and required that you wait five years before using it you would think him crazy. So he would be, for there would be no reason in such a requirement. There is reason for investing in forestry even tho the benefits are deferred, but all the same I think we must try to tie them in to the present generation closer than we have done, and show up more clearly the immediate benefits. School children can readily be interested in what the forests will be in the future, for their faces are turned that way, but the adult lives in the present and wants present rewards. One of the best ways to show immediate returns is to have them

Fire Burning at Night in a North Idaho Forest

see that their children's welfare is at stake.

Another difference is in organization. We cannot organize our selling department as a commercial house would do. In the first place, we would have no support for a policy that would build up a strong special selling organization, and in the second place, our customers are so widely scattered that centralized salesmanship is not practicable. We are both wholesalers and retailers. The man who makes or uses forestry must sell it in his own territory—to his own customers.

The selling organization proper, which is the branch of public relations, is therefore small, and its function is simply to devise ways and means, and to direct and supervise the selling activity. It should plan and lead, and help where help is most needed. Its first task, as I see it, is to build up among foresters a conception of their jobs that includes selling as well as producing, and that gets them to accept their responsibility for this part of the work the same as for any other part.

It seems to me that a clear-cut and comprehensive conception of the situation from a national standpoint is what we need to have foresters get in order that they may see the value of public relations work and their duty in respect to it. Because forests, regardless of location are of importance nationally as well as locally. Lumber is now crossing the continent by rail or going around from the western coast to the eastern by water, and it may have to go the other way some time. In the shortage which is ahead of us, location will be of little importance. What will count is the fact that there is or is not timber where it could have been grown.

If I were asked to outline in a few words such a conception, I would put it about this way: Something is wrong in our forests. It concerns everybody, but most of the people don't know it, or at least don't know what ought to be done about it. It can be remedied only thru education that will secure the interest and support of the whole people. It is high time the work of building up this sentiment is pushed if the serious effects of forest depletion are to be avoided. Those who know the condition must assume the task of educating others. The consequences of inaction are in the future, or else lack tangibility and close relation to the present, making it more difficult to secure interest. Progress is bound to be slow, and will require years of steady hammering away.

But we are well thru the experimental stage in forestry practice and have reached the stage where our job is to get these practices generally adopted. Having developed our product, forestry, and having worked out the details of its manufacture to at least, a point of practical success, we are ready to start on quantity production and take our profits. We have reached the place where advertising and selling are the things that govern success. Let every forester turn part salesman, let him work at that side of his job as studiously and faithfully as he has worked at the other and the business he has invested in will grow and prosper until it becomes a nation wide public utility benefitting every individual citizen.

DAY DREAM

The west wind dances in your hair
And fans your blushing face
It plays tag with your shifting plans
And dreams that run a race.
You feast your eyes with peaks and trees
Your soul with birds' gay song
You cannot keep your wand'ring thots
The place where they belong.
You fill your chest with the good clean air
And your mind with things you love,
You stretch your arms to the heavens blue
And know that God's above.
Your muscles swell beyond control
Your courage unsurpassed
But suddenly you're lonesome
And back to earth you're dashed.

Stanley Foss Bartlett.

THE FORESTRY SITUATION IN NORTH IDAHO

By F. G. MILLER, Dean

For want of adequate laws to prevent it, the state of Idaho is rapidly nearing the days of a waning lumber industry. Action has already been too long delayed by 25 years, for in spite of any remedial measures that may be taken now, lean years are inevitable, and the best that can be done is to mitigate them. Every year's delay is piling up huge losses from fire, and jeopardizing the future of the whole forestry enterprise. These losses are by no means confined to merchantable timber. In fact, as far as the future of forest industries is concerned, the greatest losses are sustained in the destruction of young growth on cut-over lands; and these are accumulating in the state at large at the rate of 40,000 to 50,000 acres per year. The blame rests with the general public since three-fourths of the fires are man caused, hence preventable. Moreover, the people have it in their power to enact into law the measures necessary to control the situation.

Example of Michigan

Idaho is so dependent upon her three primary sources of wealth—agriculture, forestry and mining that she cannot sacrifice any one of these even in part without serious economic results. Michigan may be cited as an example of a state which needlessly sacrificed her lumber industry. Had the state properly handled her forest wealth, she could today not only supply her home needs, but could have an excess for other markets. As a matter of fact Michigan is paying an annual freight bill of several million dollars on lumber shipped in from distant lumber centers.

But Michigan could far better withstand the sacrifice of her lumber industry than Idaho can, because the former has other important manufacturing interests, and is near the center of population hence has nearby markets for agricultural products. Idaho, on the other hand cannot hope to rival Michigan in manufacturing enterprises outside of the lumber business, and the state has a handicap of a 2000 mile longer freight hall in finding markets for excess farm products.

Professor Russel Watson of the University of Michigan is authority for the statement that it will cost Michigan one hundred million dollars to reforest her deforested, non-agricultural lands, besides three million dollars a year for 70 years to maintain these new forests once they are planted. These investments at 3½ per cent compound interest for 70 years will amount to about two billion dollars. Meantime, the state will pay from five to ten millions a year more for wood products, due to increased freight rates and advances in wood than she would need to if she grew these products at home. This, Prof. Watson adds, is the price the state will pay for not handling her original forests in a rational manner.

Area, Stand and Cut by Ownership in North Idaho

The land area north of the Salmon River comprises around 12½ million acres. Of this nearly 2¼ million acres are in farms, about 9⅓ million acres are classed as forest lands, including cut-over and burned-over areas, and the rest is grazing and waste lands.

Of the forest lands, according to an unpublished paper entitled "Public Requirements Report for District 2" by the U. S. Forest Service, the government owns 6,471,000 acres, or about 69 per cent, 2,350,000 or 25 per cent is privately owned, and the state controls 528,000 acres or slightly less than 6 per cent. This ownership is shown by the accompanying diagram.

Further reference to this diagram shows a very different situation as regards the ownership of the standing timber. North Idaho is credited with 60 billion board feet of merchantable timber, of which the government owns 24 billion feet, or 60 percent; 29 billion feet or 48 per cent is in private ownership, and 7 billion feet or nearly 12 per cent is held by the state. Thus it will be seen that while only about 25 percent of the forest area is owned privately, 48 percent of the timber is so owned.

In a paper, entitled "National Forests of Northern Idaho" by Mr. Fred Morrell, published in The Timberman for January, 1923, the lumber cut for north Idaho in 1922 is given as 800 million feet. The most striking discrepancy revealed by the diagram is the ownership of the 1922 cut, for while slightly less than half the standing timber is in private

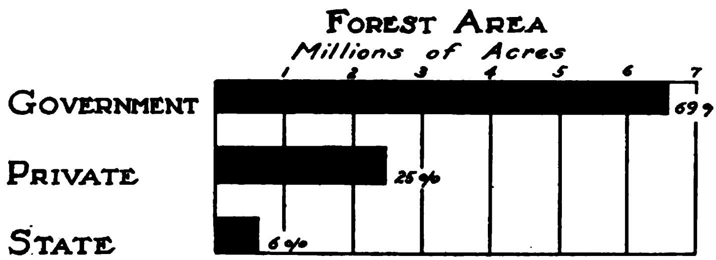
ownership, private owners supplied 80 percent of the cut, as against 17 percent by the government, and about 3 percent by the state.

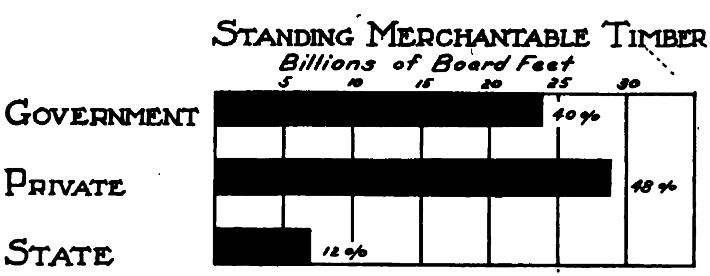
How Long Will the Timber Last?

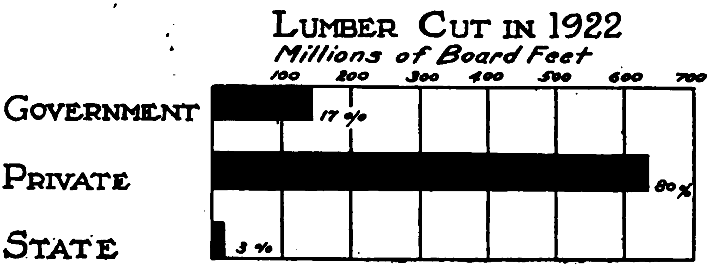
It is the settled policy of the Forest Service to cut its timber on the basis of a sustained annual yield by national forests and subdivisions of these forests, hence the government will be able to furnish a continuous supply. The state also plans to dole her timber out gradually so as to assist in prolonging the life of the lumber industry. But the privately owned timber is not being handled with reference to a sustained yield, and will, therefore, be cut out as soon as practicable. The private cut in 1922 was 640 million feet, and since the amount of standing timber owned privately is 29 billion feet it would last at this rate of cutting about 45 years.

But with the growing shortage of timber in the older lumber regions, and the consequent shift of the lumber business to the west, the cut in North Idaho will increase rapidly in the near future, so that the great body of privately owned timber will disappear in the next 25 or 30 years. The government and state forests together cannot supply on a sustained yield basis to exceed one half of the cut in 1922, hence a disastrous slump in the lumber output is inevitable.

NORTH IDAHO







The slump will be more serious by regions than for north Idaho as a whole. For example, the bulk of the cut now is from a limited territory tributary to Spokane, and the privately owned timber here will go first. Meanwhile the industry will shift to the Clearwater region, a movement which is already taking place. Towns now in the Clearwater territory will see rapid growth, new communities will spring up, and the whole region will pros-

per for a time, only to suffer the same fate as the territory tributary to Spokane when the privately owned timber is gone.

Here is a concrete example of the need of constructive measures to regulate the time, place and rate of cutting. Obviously, even if the timber lands are kept in continuous forest crop by adequate fire protection and proper silvicultural measures, stability of the lumber industry in any given community can come only when the annual cut in that community is restricted to the annual growth. If the territory tributary to Spokane were to go on this basis, it would have to restrict its annual cut to less than one-third of what it is now cutting, while the Clearwater country could increase its cut to several times its present volume. Thus if all the forest land could be kept growing timber to capacity, there would not be any serious reduction in population or number of mills for North Idaho as a whole, but a redistribution of both, and the towns and industries dependent upon the lumber business once adjusted to the new conditions would be stabilized and made permanent. However, regulatory measures to bring about such a condition are impractical at present, but something to work toward in the future.

Meanwhile let it be repeated that it is most fortunate that we have these great national forests which are being managed with reference to permanency in all districts. It is fortunate also that the state is managing her timber holdings with a view to stabilizing the lumber business by selling her timber gradually, rather than as rapidly as opportunity offers. Both the government and the state should husband their timber resources against the time when the slump is upon us.

Slow Demand for Logged-Off Land

The impression prevails in some quarters that the economic loss resulting from the decline of the lumber industry a few years hence will be offset by converting logged-off lands into farms, but facts at hand do not support this idea. In the first place only a limited portion of the forest area has agricultural value. The 69 percent of the forest area in government ownership is practically all non-agricultural. The bulk of additional agricultural land, therefore, will have to come from the state and privately owned forest areas. The best available information at hand would indicate that all told probably not more than a million acres of additional agricultural land can be developed out of the forest areas in North Idaho.

Of the 2¼ million acres of farm land, about one million acres are improved. It is of interest to note that nearly 89 percent of the improved farm land is found in Latah, Lewis, Nez Perce and Idaho counties, which means that it has been converted not from logged-off land, but from the prairies. A considerable part of the other 11 percent is found along the river and creek bottoms or originally existed as natural meadows within the forest belts. Hence it is that a small percentage of the actually improved farm land has been converted from cut-over land.

Development of the agricultural logged-off lands should be given every encouragement possible and some headway in clearing is being made in restricted localities here and there. But the fact remains that as a whole logged-off land is being developed extremely slowly. Even when clearly agricultural in character and near railroad transportation, it is awaiting settlement and development. All such land should be kept at work growing timber till it is actually needed for agricultural purposes, although this is far from the case.

A Million Acres of Idle Land

Data recently compiled for North Idaho from the county assesssment records show about 1,800,000 of cut-over and burned-over lands. Field notes indicate that not over 40 percent of this area is restocking to a degree which would be even passably satisfactory. If this be true, then north Idaho has not less than one million acres of devasted or semi-devasted forest land, on the tax rolls, the greater part of it comprising our finest white pine lands. Some of these lands have a limited value for grazing purposes, but for the most part they are tramp lands, and represent just so much economic waste. If they had been kept in continuous forest production they would be growing annually at least one hundred million feet, or one eighth of the timber cut in 1922.

Wood Industries Seek to Locate in Idaho

As the supply of timber gives out in the older timber centers the secondary wood using industries seek new centers of supplies, and move hither. Many such industries now have their representatives in the west including Idaho scouting for new locations. A few have already located here. Among these, the Diamond Match Company, the Ohio Match Company and the Inland Empire Paper Company may be cited. The latter's mill is

located at Millwood, Washington, but it draws mostly upon Idaho for its raw material. But many secondary wood using concerns are loath to move to a new location unless they can have assurance of a permanent supply of wood. If Idaho could keep all her forest lands in permanent forest production, the number of wood manufacturing concerns which would locate here would in the aggregate support a formidable pay roll.

Remedial Measures

To keep the logged-off lands continuously covered with growing timber is the most important forestry problem the state has to face. It is not the work alone for the owners of these lands. Timber regardless of ownership to an unusual degree is a community asset, and the burden of growing it is therefore a community responsibility.

Owing to the lack of space, only a few of the essentials of a State Forest policy are here suggested:

1. The first of these is the creation of a state department of forestry presided over by a state forester.

2. A second essential should provide for a more rational disposal of slash resulting from logging operations. Under the Fallon fire law enacted in 1907, the general custom has been to broadcast burn the slash, if any disposal was made at all, a method which not only destroys all young growth below merchantable size, but one which in stands where such growth exists after the merchantable timber is removed, does not reduce the fire hazard.

It is conceded that in the mature or overripe white pine stands, where little or nothing in the way of tree growth is left after the merchantable timber is cut, broadcast burning of the slash may be permissible. But in stands where after logging, advanced growth is left, which might become the foundation of a new crop, broadcast burning is wholly wrong. Over large areas in the white pine type, trees left would furnish a second cut by the time the present merchantable supply is gone, and would thus serve to prolong the life of the mills now in operation.

As applied to the white pine type, the Fallon law should be so amended as to provide that the slash incident to logging shall be piled and burned, unless otherwise ordered by the state forester.

3. A third essential would seek adequate protection both for all merchantable timber and all cut-over lands, the expense to be shared by all owners on an equitable basis aided by federal and state funds. At present a considerable percentage of the merchantable timber as well as of cut-over lands is riding free.

A large part of the cut-over lands in north Idaho is within organized fire districts, where it receives some, though not adequate protection. A still larger part is in unorganized territory and receives no protection whatever. As stated above in spite of these conditions, possibly 40 percent of the cut-over lands in this section is reproducing to growing timber, and much more of it would restock if given a chance.

In this connection, it is of interest to note the following resolution adopted at a recent meeting of the Standardization Committee of the Western Forestry and Conservation Association, representing lumber interests, federal, state and private, in Idaho, Montana, Washington, Oregon and California.

"Resolved that we favor giving cut-over and burned-over lands and areas restocking with young growth, adequate protection against forest fires, and to this end endorse a policy whereby owners of such land contribute for their protection on some reasonable basis, which contribution should be supplemented by substantial federal and state aid."

This plan of cooperation in part is now in effect in Idaho but it needs to be extended with greatly intensified efficiency to cover all logged-off areas.

Other amendments to the present law and new sections will be necessary if the situation is to be fully met. If from the beginning of timber operations, Idaho's forest lands could have been restocked as logging progressed and kept producing to capacity, the lumber industry could be maintained permanently in its present magnitude, if indeed it could not be substantialy increased.

THE INTRODUCTION OF LOG LOWERING SYSTEMS IN THE INLAND EMPIRE

By THOMAS B. JACKSON, '19, Logging Engineer

Within recent years log transportation has become more and more a railroad proposition and as the logging operations have moved into steeper country, logging railroading has developed quite differently from ordinary railroading. One new development in steep railroading is what is called the "incline" or log lowering system. The loggers developed special geared locomotives and put on extra braking equipment for steep grades but these only served for grades up to ten or twelve per cent. The incline or log lowering system has permitted the handling of logs on almost any grade. The first and simplest type of log lowering system was merely a logging donkey used to lower cars of logs with a line. This worked very well for straight pitches that were not too steep, but for curves and steep grades, say above thirty per cent, other difficulties were encountered. In order to keep the cable from bending and wearing on the curves, several different kinds of rollers have been used. With the increased popularity of the lowering system, different logging equipment companies have been building lowering engines with powerful brakes and special safety devices to better fill the needs of this class of service. Another difficulty encountered in steep grades is in keeping the logs from sliding off the cars. This is overcome by putting a choker around the load and lowering by this choker.

One of the chief advantages of an incline is that the roadbed can be of cheap construction. It can follow the contour of the ground, breaking from one gradient to another as long as it is steeper than six or eight per cent. Another surprising thing is that the track can be of much lighter construction than that for an ordinary railroad due to the absence of the driving action of the locomotive.

There are two distinct types of lowering systems in quite common use, the simple or straight lowering and the balanced type. The former consists of a special donkey engine which lowers and raises the car with a single line. In the latter, the line takes three or four wraps around a gypsy or endless drum, a car is attached to each end of the line and one car is lowered while the other is being hauled up, thus utilizing the force of gravity to save power and fuel.

A variation of the simple lowering system which has proven quite successful on grades under thirty per cent has been developed by Mr. E. B. Sessoms of the Ebey Logging Co., at Arlington, Washington. It consists of a car, which Mr. Sessoms has patented, upon which are fastened huge blocks. One end of the lowering line is made fast at the head of the incline, the other works on the drum of the engine, and the bight of the line works thru the blocks on the car. The cars to be raised and lowered are coupled to the lower end of this special car. A detailed description of this system can be found in "The Timberman," for August 1921. Through a system of rollers and hangers, Mr. Sessoms has eliminated much of the wear on the line and claims three or four times the average length of life for his lowering line.

The big cost in the operation of a steep incline is wire rope, and then come labor and fuel. The life of an inch and a half line on the average lowering system is comparatively short, depending of course upon the character of the installation, the amount of curvature, the grades, and the care given to the line. On one operation in the Puget Sound district, which has practically no curvature but grades up to 60 per cent, they have averaged eleven million feet with an inch and half line. On another one near there, where the grades run up to 35 per cent, they averaged twenty three million feet. Mr. Sessoms on one of his operations, lowered 150 million over a grade of 2ß per cent with one line.

Crude oil seems to be the popular fuel for these machines for the sake not of economy only, but also because of ease in operation and safety from fire. Due to the length of an operation, wood would have to be transported some distance which would not only be costly but would interfere with the rest of the operation.

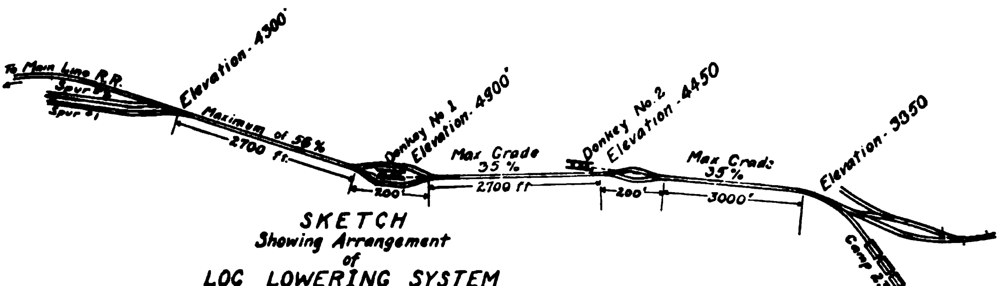
Lowering systems in some form have been used on the coast for several years. It is, however, only in late years, since the logging operations have moved into the rough country, that they have become popular. The

first one to be used in the Inland Empire has recently been installed by the Edward Rutledge Timber Company, near Clarkia, Idaho. The company had about ten miles of railroad located with which it was planned to tap their Bussell Creek timber. This timber had to come out over a divide and most of this ten miles of survey wound around through the mountains to get a reasonable grade, part of it being "dead" line, i. e., running through land on which there was no merchantable timber. In the fall of 1921, the company's engineer conceived the idea of putting in a lowering system to haul the logs over the divide in order to save building this ten miles of expensive railroad and that winter he ran the necessary surveys and planned the system in detail.

In the summer of 1922 a severe fire burned over quite an area of the Bussell Creek timber and scarcely was the fire under control when the company decided to install the incline. Clearing and construction were begun immediately and a logging equipment engineer arrived, looked over the ground, and sold the company a couple of lowering engines. The first engine arrived in September and was immediately assembled and moved to the top of the divide under its own power. The second engine came in October and was pulled over the divide by engine No. 1, while still on the car. A set of camp cars were moved over during the first part of December and a couple of locomotives and a loader by the middle of the month. The first load of logs was loaded and sent back over on the 21st of December.

The Rutledge lowering system is in reality two different systems working in unison. The logs are loaded at Camp 23 or below and brought by locomotive to the foot of the incline as indicated on the accompanying sketch. The cars are then pulled one by one about half way up the hill by engine No. 2. No. 2 is the simple type of lowering engine, the line winds up on the drum as the load is raised. Engine No. 1, placed on top of the main divide, takes the car of logs where No. 2 leaves it and hauls it the rest of the way up the hill, at the same time lowering a car of logs down the other side of the mountain. This is the balance type of operation. The line takes four or five turns around a gypsy drum on the donkey and a car going down is always helping to pull a car up on the opposite side, of the hill. When one car of logs arrives at the top of the divide and the other car at the bottom on the main railroad side, an empty car is fastened to each end of the line, the engine is reversed and the empty going down helps pull another empty up the hill.

Engine No. 1 sits in the center of a level passing track one hundred and fifty feet in length. A small two drum auxiliary engine deriving its steam from the main engine boiler is used to pull the cars from one end of the passing track to the other. Spur No. 1 on the main railroad side with a capacity of 15 cars, has a drop of one per cent toward the incline. A locomotive places a string of empties upon it and they can then be dropped by hand as needed to where they can be made fast to the end of the line. Spur No. 2 has a drop of one per cent away from the incline and the loads can be dropped out of the way by hand until a locomotive hauls them away. A gravity flow of water was obtained for No. 2 but from there the water had to be pumped by steam to No. 1. At present engine No. 1 burns oil and No. 2 wood. Oil burning equipment will be installed in No. 2 as soon as the wood in its immediate vicinity is used. At the time of writing the capacity of the installation has not been tested but is estimated that it will



SKETCH
Showing Arrangement
of
LOG LOWERING SYSTEM
of the
Edward Rutledge Timber Co.
Clarkia, Idaho.

handle from twenty to thirty cars in eight hours.

If this installation proves as successful as it promises to be, there is no doubt that inclines will play a prominent part in the future moving of logs out of the rough mountains of the Inland Empire, which are almost inaccessible by ordinary logging railroad grades.

THE PRESENT STATUS OF WHITE PINE BLISTER RUST IN THE WEST WITH SPECIAL REFERENCE TO THE WHITE PINE IN THE STATE OF IDAHO

By HENRY SCHMITZ
Associate Professor of Forest Products and Agent. Office of White Pine Blister Rust Control, U. S. D. A.

It is a fact that the forests of Idaho constitute one of the state's most important resources. Furthermore, it is also a fact that under the existing economic conditions the State of Idaho cannot have any marked degree of prosperity without the lumber industry. It is imperative, therefore, particularly from the standpoint of the future that the forests should be perpetuated. Three factors militate against perpetuating the forests, namely, destructive logging, fire and disease. In many respects destructive logging is of the least importance since it can easily be controlled and the state and community profit at least temporarily by utilization of the forest crop. In the case of both fire and disease, no one profits even temporarily. Moreover, both necessitate the expenditure of considerable money if they are to be controlled. Of the two, fire and disease, disease is in many respects the harder to control. The above statement should not be interpreted as a defense for destructive lumbering. The only purpose in making the statement is to substantiate the contention that of the three destructive factors, disease is at least equally as important as any other.

In many respects, plant diseases have much in common with animal diseases. There are those diseases both of plants and of animals, which are with us always. They do their damage, take their toll and continue to be with us. On the other hand, there are those diseases which visit us but seldom,- the causes of epidemics, plagues, calamities,- which leave destruction and desolation in their path. Such a disease of plant life is chestnut blight which practically wiped out chestnut in the eastern United States in a brief period of about fifteen years. Such a disease is white pine blister rust, which unless controlled, now threatens to destroy Idaho's most valuable timber tree,- white pine.

Since the discovery of white pine blister rust in the west in 1920, considerable information concerning the disease under western conditions has been collected by the Office of White Pine Blister Rust Control and to some extent by other agencies. It is from the above sources that the information herein contained was obtained.

Although there is still a little doubt as to the exact time when blister rust was introduced into the west, the evidence strongly indicates that as far as is now known, it was first introduced in 1910 on a shipment of Pinus strobus seedlings from Ussy, France. There is also considerable evidence to show that the disease might have been brought into the northwest at several different times but the above mentioned case is apparently the earliest.

Since the time of its introduction, blister rust has made rapid progress in its spread especially in a northeasterly direction. This is undoubtedly not only due to the fact that during the spring and early summer the general direction of rain bearing winds is from the southwest, but also to the fact that cultivated black currants are more common to the northeast. It is also during this late spring and early summer period that most of the aeciospores are produced. From the probable original point of infection, which is Vancouver, British Columbia, blister rust has now spread as far south as Ilwaco, Pacific County, Washington, and north to the northern limits of the range of western white pine, a distance of practically 150 miles in both directions. In all probability, the infection found at Revelstoke, British Columbia, is a distinct introduction of the disease and not connected with

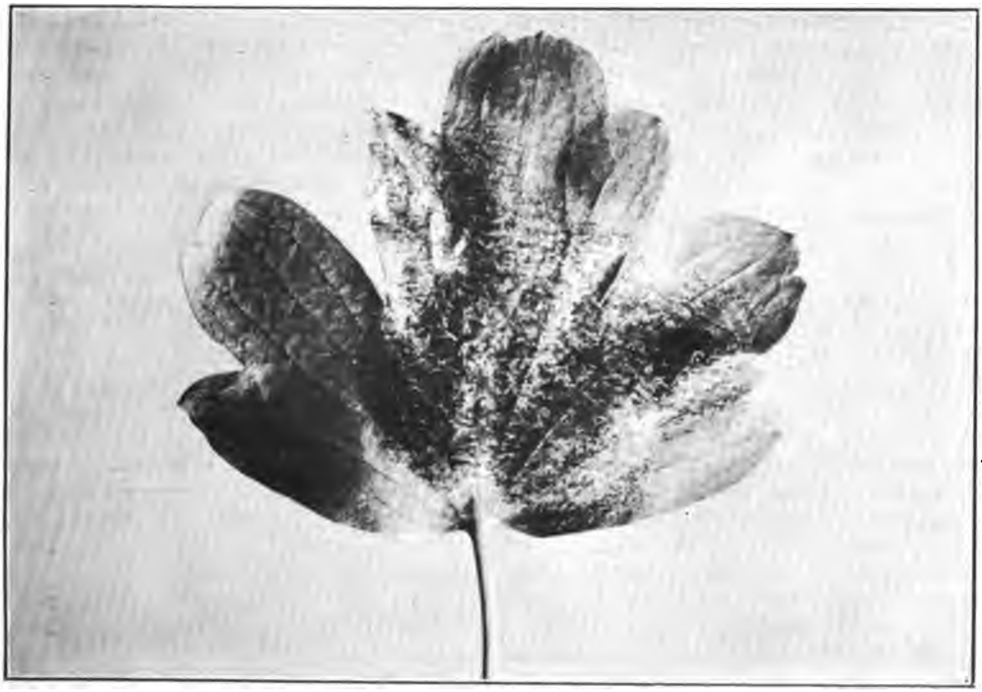
WHITE PINE BLISTER RUST

The stage of the disease produced on pine appears in the spring and early summer. The blisters or pustules are a bright orange yellow color. Each one of these blisters liberates millions of spores which carry the disease to currants and gooseberries.

the Vancouver infection. If the Revelstoke infection spreads towards the south as rapidly as the disease has spread on the Pacific Coast, the disease will be intrenched in the heart of the white pine area of the north Idaho by 1935. It is possible also, unless the greatest care is taken in the enforcement of existing quarantine regulations, that the disease may be introduced into Idaho by artificial means at a much earlier date.

Some of the most important data collected by the Office of White Pine Blister Rust Control are those concerning the relative susceptibility of various species of currants and gooseberries to the disease under Pacific Coast conditions. Based upon his observations on naturally infected Ribes in the northwest, Dr. Pennington has placed them in the following order with reference to their apparent susceptibility and probable capacity to become infected from a far distant pine infection: R. nigrum, R. bracteosum, R. Sanguineum, R. divaricatum, R. laxiflorum, R. lacustre, R. vulgare, R. viscosissimum and R. lobbii. From the point of view of establishing the disease in a new locality, R. nigrum (the cultivated black currant and its varieties) is of greatest importance not only because it is most susceptible to the disease but also because it usually stands exposed in gordens and is not shielded by the surrounding vegetation as are the native species in the forest. For these reasons it is absolutely essential, in order to keep the disease out of Idaho, that all cultivated black currants in the state be destroyed at once.

There is another point in connection with the cultivated black currants which is worthy of mention. Blister rust can spread from most varieties of currant and gooseberries to pine only for a distance, under most conditions, of 300 yards while the disease may spread from the cultivated black currant to pine for a distance of at least one mile.



WHITE PINE BLISTER RUST

Two stages of white pine blister rust are produced on currants and gooseberries. The late stage, pictured above, forms clusters of brown horn-like columns of spores, which carry the disease back to white pine trees.

The question of the probable damage this disease will cause to western white pine is of greatest interest and the data so far collected are anything but encouraging. For example, the data gathered on a sample plot at Daisey Lake indicate that 96 per cent of the

white pine on the plot will have been killed ten years after infection. The trees on this particular plot were infected in 1915 and 1916 and by the spring of 1922, or about six years after infection, 40 percent of the trees had already been killed.

That western white pine is very susceptible to the disease is shown by the fact that many of the infected trees show an unusual number of cankers. For example, a 36 year old tree in the Daisey Lake region had 353 cankers or an average of seven per branch. Another tree 28 years old had 316 cankers or an average of 10 per branch. These figures, although high are not unusual and do not give an exaggerated idea of the severity of the infection. On account of the fact that infected trees usually have such an enormous number of cankers, death of the tree usually results from the killing of the branches rather than from the girdling of the tree trunk by a stem canker. From the standpoint of the mature western white pine in the Inland Empire this has a serious aspect since it does not seem unreasonable to suppose that these mature trees may be killed in a similar manner. It has been generally supposed that it would take quite a few years for blister rust to kill these mature trees even after they had become infected but there is liittle evidence in support of this supposition.

In order to postpone as long as possible, the day when blister rust will finally get into Idaho and in order that it may be controlled after it does get in, the best efforts of private, state and federal agencies are required. The general public itself has a part to play in this program,- a duty to perform. The most important immediate step is to free the state of all cultivated black currants. Almost equally as important is the strict observance of state and federal quarantine laws. Do not transport or receive currants or gooseberries or white pines from regions where blister rust is known or suspected to be present.

If these two steps are taken we can at least hope to keep blister rust out of Idaho for some time.

TRAINING COURSES FOR FOREST SERVICE PROTECTION FORCE

By PAUL H. GERRARD, '23

Fire protection has assumed paramount importance in the forest activities of the nation. To cope with the situation all possible means are being used to effect as efficient an organization as possible. Permanent employees are used for directing the fire organization while on most forests where protection is the big problem, many temporary men are employed for a short period each year. Since it is only natural for the desirable type of men to desire and accept permanent work whenever possible, it is not possible to depend upon men for temporary jobs year after year unless the fire season fits in well with other seasonal jobs. The work is a profession in itself and proficiency can be acquired only by training and experience. Since it is not possible to secure all of the former employees year after year, it means that new men must be employed. These men to be of most value should have experience and knowledge of the protection work, and the work necessary to maintain a protective organization. To prepare the men for this work and to develop men for the more responsible positions, it has been found desirable to give a training course of three days duration. To a certain extent it will supplant experience in that the inexperienced man will be able to profit from the experiences of the older men.

Last season it was the general policy in District 1, U. S. Forest Service, to hold a two or three day training course for the selection and training of protection men. The courses given varied to some extent in the different forests. Some included written examinations and field tests. Wages were paid in accordance with the ratings received in the examinations. The results of the courses given proved that the time spent in giving the instructions was more than offset by the increase in efficiency and interest of the men in their work.

The following plan is taken in part from "Instructions and Training for Protection Men," issued in 1922 by District One, U. S. Forest Service. It has been further worked out to best suit the needs of the Clearwater National Forest, where it is intended for use this season.

Clearwater National Forest Selection and Training of Protection Men

I. Object:

The training and instructions of the protection force is furthered in order to obtain the highest possible standard in the protective organization. Hence, it is planned to give instructions and to rate each man on the things ordinarily expected of a forest guard.

A good forest guard should, of course, be possessed of ordinary intelligence. He should be dependable and industrious, have plenty of common sense and judgment and be otherwise endowed according to commonly accepted standards. We need not dwell upon the analysis of personal standards but get down to plain statements regarding the things most tangible that are expected of most forest guards. In so far as personal qualifications are concerned, we want to secure the very best men possible who reside in or near the region to be protected.

II. Ideal Standards for Selection and Training of Guards:

1. Report for duty properly equipped for the work at hand. Shoes should fit and in most cases should be hob-nailed. Clothing should be of such nature and of such quality as to enable the applicant to convey the impression of a woodsman. Should be equipped with a sharp substantial pocket knife and a watch that will keep time.

2. Physically able to carry a standard fireman outfit up and down mountains for the better part of two days. Physically able to fight fires at the end of such a trip. Able to cook his own meals and sleep on the ground. Willing to place duty before pleasure when occasion demands a display of physical endurance. In other words, should not be adverse to the life of a fireman or woodsman.

3. Know where to build a camp fire and when it is safe to leave i.t

4. Know how to fight a small forest fire. Be able to construct a safe trench. Should appreciate the danger from burning snags, burning roots, rolling logs, etc. Know that the safe fire like the unloaded gun oftimes does the greatest damage. In other words, know through experience and training when a fire is safe.

5. Be able to convert the reported azimuth reading into a compass reading and to place himself in the line of sight between the lookout and the fire. Have the necessary perseverance to actually put himself in line with the fire, when this is necessary, in order to find it.

6. Qualified to fill out a fireman or lookout report, also to keep a diary properly. For the purpose of the report should be able to name and distinguish the more common species of timber. Be able to tell a section line when he sees it, to determine the location of a small fire with reference to the section lines and to place it in the proper forty on the fireman map.

7. Be able to pace out an acre of ground and to report the acreage of a small fire.

8. Know when his compass is set for declination.

9. Should be able to level and orient a lookout board and report azimuth readings and distances for a given fire.

10. Know how to number sections and how to determine townships and ranges. In other words, know how to read and use a map.

11. Know the care and use of a carbide light or palouser and how to travel with one at night. Also know how to use one when fighting fires at night.

12. Should be able to pass a fair eyesight test.

13. Know the difference between a good telephone ground and a poor one. What telephone trouble to expect after a lightning storm and how to detect and eliminate it.

14. Should be able to ride and pack a horse and to manage a pack outfit in case of fires, independent of others.

16. Should have the proper attitude toward Forest Service work in general. Should be an all-around helper to the District Ranger. If a patrolman, should consider it perfectly proper to be transferred to fire suppression work. Before and after fire season should be willing to maintain improvements, construction of trails and telephone lines, to work on buildings and to otherwise qualify as a forest worker, not as a specialist hired to sit on a job at the end of a telephone line.

17. Be a man who is able to do things. Every man is not able to hang an axe, file a saw, temper a mattock, blow a stump, climb telephone poles, shoe horses, locate trails and to do the many other things which must be attended to in the Forest Service. He should have gained for himself the reputation of being a good all around man.

18. Above all things he should be dependable.

19. He should know how to take proper care

of his equipment and what action to take when any is lost, broken or worn out.

20. Should believe in fundamental principles of conservation for which the Forest Service stands. Should be familiar with the work of the Forest Service, particularly the local problems.

21. Proper attitude toward the game laws.

22. Familiar with the State Fire Laws, not only should the applicant be in a position to observe the fire laws himself but in addition he should be in a position to give correct information to others with whom he comes in contact.

23. Know what the Forest Service is trying to do in the way of preventing forest fires and what he can do to help.

24. Familiar with the many details of the most probable summer assignments including outstanding written instructions.

25. Familiar with the topography, bodies of timber, trails and telephone lines.

26. Familiar with the fire plan, fire organization on the District employed and special written instructions from the Ranger.

These standards may seem rather elaborate at first but do we ask a forest guard to do a single thing which should not be required of him in the heat of a severe fire season?

Under these standards the prospective forest guard is expected to know considerable about the fire and game laws. Ignorance of the law is not countenanced by the Forest Service when a local settler has killed game out of season or has set a fire without a permit in violation of the law. If people outside of our organization are expected to measure up to these standards, certainly it must be reasonable to require forest guards not only to know the laws, but to obey them. Incidentally our temporary organization offers a splendid opportunity to reach the people. A guard who is familiar with the purpose of the organization for which he is working, who acquires knowledge regarding the local problems of the Forest Service and who believes in the fundamental principles of conservation offers a means of contact with the public which cannot be overestimated. Training, according to the previously mentioned standards, simply means that we will have 60 to 100 men disseminating information to the public instead of only a few forest officers.

III. The Training Course.

It is planned to hold a three day course covering both general and specific information as well as the practical work which would tend to result in a more efficient forest guard. Each man will be rated on the oral and practical work. The test on the oral part will be an oral examination or discussion and on the practical work by actual field tests. The tests should be such as to make sure that each man has a clear conception of the main things included in the course and expected of him. The various topics covered in the course are grouped and specific weights or percentages assigned to each group for grading the men. The men will be rated in the following classes according to the total score made in the oral and practical tests: excellent, 90 to 100; good, 80 to 90; fair, 70 to 80; poor, 60 to 70. Those of the first two ratings will be considered as of protection type. Those of the third class would be considered as doubtful in the protective organization and the fourth class would include those considered as undesirable in the protective organization.

While wages will not be based on results of this examination it will indicate the capabilities of each man, and the rate of pay is regulated by capabilities of the individual.

All protection men will be required to take the training course and as many in the improvement crews as possible, for the latter are often called upon to aid and to fill vacancies in the protective organization.

The three days program will be as follows: The first day and one half will be devoted to the special instructions and information, and the afternoon of the second day and the forenoon of the third day will be devoted to practical problems in the field. The afternoon of the third day will be used to clear up hazy points and for the oral discussion.

The course will be conducted by at least two men and three if possible. Each ranger should make himself familiar with the main points and if the course is held on his district should collect and prepare the following equipment; lookout equipment; fireman's equipment; telephone equipment (brackets, insulators, wire); a telephone to work on; pack and saddle horse outfitted; two white flags at a distance of ¼ and ½ mile apart respectively; cross-cut saws, one for filing demonstration and one for actual use; axe properly hung and sharpened. He should also measure in advance an irregular tract for pacing and estimation of area.

The program will cover the following points:

1. The training course.

   A. The objects of the school.

B. The ideal standards for selection and training of guards.

2. The Forest Service.
   A. The objects of the Forest Service.
   B. The benefits of the Forest Service to the public.
   C. The organization of the Forest Service.

3. The Clearwater Forest.
   A. Its area, assets and future prospects in timber, grazing, recreational uses, etc.
   B. Policy or forest plans which have a bearing on the work.
   C. The forest organization.

4. Fire.
   A. The general problem in the United States.
   B. Our particular problems.
      a. The high fire hazard.
      b. The job of protection, why it is our job, and the damage caused by fire in this forest.
      c. The fire organization and duties of each man.
      d. The fire forms, their purpose and use.

5. Fire Fighting.
   A. Accurate location and elapsed time record.
   B. Fire fighting equipment.
   C. The fire trench, snags, etc.
   D. General method of attack.
   E. Estimating fire damage.

6. Fire Studies.
   A. What is being done.
   B. Results of studies.

7. Laws.
   A. The federal fire laws.
   B. The state fire laws.
   C. The game laws.
   D. Our duty in respect to the laws.

8. Azimuth and Compass.
   A. Azimuth and compass thoroughly explained.
   B. Orientation of map board, how and why.
   C. Conversion of azimuth and compass readings and the possible uses.

9. Map Reading.
   A. United States land survey system.
   B. Contour map, its purpose and use.

10. Methods of Measuring Acreage.
   A. Circular method.
   B. Square or chain method.
   C. The tendency to overestimate.

11. Estimating Distance.
   A. How to check your estimate of distance.

12. Protective Organization.
   A. Organization on the ranger district.
   B. General instruction to firemen and lookouts.
   C. Special instructions covering location of the men and duties of each.

13. Improvements.
   A. Trail
      a. Construction standards.
      b. Maintenance standards.
      c. Special instructions from rangers on certain projects.
   B Telephone
      a. Construction standards.
      b. Maintenance standards.
      c. Special instructions from rangers on certain projects.
      d. Telephone troubles.
         1. Ground rod-line-protection.
         2. Phone circuits and how to test.
         3. Care of the phone.
   C. Buildings and associate improvements.
      a. The construction and maintenance of buildings.
      b. Fixing the permanent camps comfortable, handy and sanitary.
   D. Signs.
      a. The use and maintenance of signs.
      b. The defacing and mutilation of signs.

14. Property.
   A. Care of property.
   B. How to file a saw, hang and sharpen an axe, sharpen or temper a mattock.
   C. What to do when property is lost or broken.

15. General
   A. White pine blister rust.
   B. Other topics of general interest.

16. Practical field work.
   A. Orienting map board.
   B. Azimuth and compass reading.
   C. Estimating distance, eyesight tests.
   D. Fire fighting.
   E. Reports, fire and diary.
   F. Telephone troubles.
   G. Telephone line work, climbing, splicing, etc.
   H. Rations and ration lists.
   I. Log cabin construction.
   J. Identification of common trees.
   K. Estimating acreage.
   L. Packing.
   M. Sawing wood.
   N. Hiking and back packing.
   O. Camping and cooking.
   P. Estimating fire damage.

The following weights will be used in rating the men:

Firemen: Lookouts

Training and experience (25 points)

1. Training in or out of forest service which tends to fit man for job 20..........20
2. Experience in Forest Service 5.......... 5

Practical Field Tests (55 points)

1. Personal equipment: watch, knife, shoes, clothing, condition of fireman's outfit 5.......... 3
2. Orientation, azimuth, compass reading 6..........12
3. Hiking and backpacking, enroute to fire, elapsed time start to arrival, accurate location 14..........10
4. Fire fighting, 7.......... 5
   a. Trench, (width, depth, clean-safe, time to construct).
   b. Snag, (cut down in workman-like manner).
5. Reports: lookout and smokechaser's fire reports, diary, etc. 5.......... 5
6. Camping: fireplace and fire, cooking, making and locating bed, sanitation 4.......... 4
7. Telephone work: Protector blocks and fuses, ground rod troubles, tests with telephone receiver 3..........3
8. Eyesight and judging distance 2.......... 4
9. Performance 9.......... 9
   a. Climb telephone poles, place insulators, splice wire, tie wire dead end and bracket, show how to perform the last two.
   b. Saw wood.
   c. List of rations for 2 men one week and such pack equipment for one pack horse.
   d. Name five common native trees.
   e. Pace an irregular area and give acreage.
   f. Make a list of material for a 12' x 14' log cabin, shake roof.
   g. Hew or adze a pole.

   N. B. Show men how to file a saw, hang an axe, saddle horses, handle powder and sharpen or temper a mattock.

Oral Test (20 points)

1. Fire manual and general instructions 10..........10
   a. Specific fire problem, 100 acres.
   b. Danger places after trench is around fire.
   c. Prevention of fires from passing beyond control.
   d. When is lookout board properly oriented? How is it done?
   e. Converting azimuth to compass reading.
   f. List the equipment you are supposed to take with you to a lightning fire.
   g. What is a Class B fire and what action is taken after reaching such a fire?
2. Prevention 4.......... 4
   a. How to build a camp fire and when is it safe?
   b. Main features of Idaho fire laws, slash and burning permits.
   c. Only sure way to reduce loss from fires.
   d. State three of the six rules for fire prevention.
3. Improvements 3.......... 3
   a. State five main points in telephone construction.
   b. State main points in trail construction.
   c. How to locate telephone troubles
4. Game laws and property 3.......... 3
   a. Game laws; bird, fish and big game.
   b. What action is necessary when equipment is lost, broken or worn out.

Advanced Course.

The results of the past season proved conclusively that the first training course aided in securing a more efficient organization and it is thought that an advanced course for those who have attended the first course, also for trail foremen, would not only train the man for the more responsible jobs, but increase the quality or standard of their work.

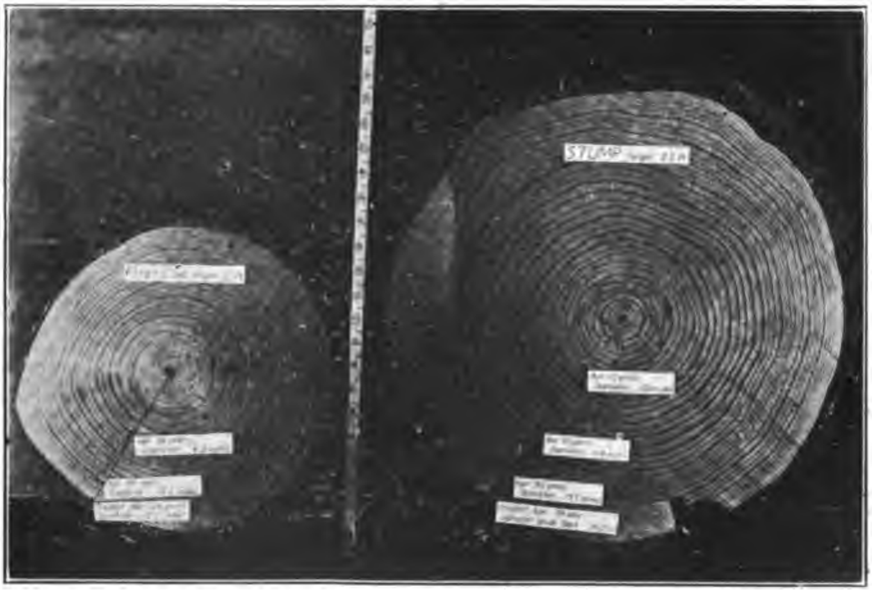
A course of one or two days duration covering in greater detail information concerning the Forest Service, fire fighting, trail and telephone construction and any other special work going on in the forest would prove most valuable. The greatest benefit from an advanced course would be the general discussions whereby each one would receive the value of the other fellow's experience.

NOTES ON GROWTH AND YIELD OF SECOND GROWTH WESTERN YELLOW PINE IN NORTH IDAHO

By C. EDWARD BEHRE
Associate Professor of Lumbering.

In north Idaho there are large areas of forest land covered with dense fairly uniform stands of second growth western yellow pine, locally known as "Bull Pine," varying in age from a few years up to 40 or 50 years. For the most part these young stands of yellow pine are found along the foothills of the great forests of the Bitterroot and Coeur d'Alene mountains, fringing the borders of the fertile and thickly settled prairie lands to the west.

In the early days these hills supported a fine stand of virgin western yellow pine, which has practically disappeared before the axe and saw of the miner, the settler and the sawmill operator, but whose quality may still be judged by the rapidly decaying stumps everywhere present and the few remaining untouched areas. With the cutting of the virgin stand the ground was given over to the unrestricted development of the seedlings which were for the most part present, altho inconspicuous, before the removal of the old trees, or else became established shortly afterward by seeding in from the scattered individuals not taken by the somewhat fastidious logger of early days. As a result we now have large areas of second growth in practically even-aged stands, many of which are rapidly reaching the stage where they will cease to be regarded as "brush" by assuming all the characteristics of thrifty young timber.



SECTIONS OF A SECOND GROWTH WESTERN YELLOW PINE

showing the rapid growth which young trees of this species will maintain when given full light. This open grown tree had attained a diameter of 19.2 inches and a height of 57 feet in 44 years. The volume of its stem was 45.7 cu. ft. or about ½ cord and it contained two merchantable logs, scaling 180 bd. ft., International Log Rule.

Very few of the local inhabitants realize the potential value of this young growth and in many cases it is even considered a nuisance. Fires are often allowed to run uncontrolled through these areas because the local residents see no value in the young trees and believe the grazing will be improved by their removal. Along the lower limits of the forest belt one often sees fine stands about 30 years

old being cut down so that the land may be placed in cultivation. The yield of fuelwood in these cases is very small, if any at all, because the trees are only beginning to reach a size which justifies their handling. It seems a shame to throw away in this fashion the growth of 30 years, because, with the sapling stage passed, the amount of wood produced in the next few years will be surprisingly great and holding these stands to take advantage of this fact, should pay good dividends.

In many cases it is doubtful whether agriculture can be made a success on lands cleared in this way, but even granting that the lands have agricultural value, potentially they are in a much better position for forest crops than for farm crops. When these lands are put under cultivation they come into direct competition with the fertile treeless area to which they are adjacent and the products must be sold in the same markets. The cost of clearing will equal or exceed the price for which improved farms in the open country can be purchased and then in most cases the distance to the towns, warehouses and railroads will be greater and the soil of poorer quality.

On the other hand these areas are in a most advantageous position from the standpoint of forest production. Lying adjacent to a large and thickly settled treeless area there will always be a strong demand for fuelwood, posts and lumber which these lands can most profitably supply. Farmers in this section often go thirty miles to get fuelwood for their winter's needs and each year finds the supply getting further back into the hills. The man with fuelwood for sale along the edge of the timbered belt will always be able to command a good price for his product, and as a corrollary, the same will hold true of lumber which may be cut by small mills and sold to the local markets more economically than that which is imported from distant mills.

Even foresters, who see in these young trees, boards with which our children may build their homes, and wood with which they may warm their hearths, have little positive information upon the exact quantity and quality of material which these stands will produce in a given period of time, or of the age at which their owners should harvest the crop in order to realize the maximum profit.

It is not easy to answer these questions because so few stands are available which have developed under the conditions which these young stands exhibit. In the virgin condition western yellow pine is practically always many-aged and very rarely do even-aged stands develop except as a result of cutting. The oldest cuttings in this section are not over 50 years old and hence sources of information as to what these young stands will yield when they reach 70, 100 or 150 years of age are very meagre. Measurements made of two tracts where the stand was approximately even-aged over a considerable area should therefore be of interest as indicating what may be expected from this second growth.

In both of these tracts about 5 acres were tallied in strips spaced to cover about 20 percent of the area and, in addition, sample plots representing normal fully stocked portions were laid out and sample trees felled and measured as a basis for computing the volume of the stand and the form of the trees. The accompanying table summarizes the results obtained on these two areas.

The first of these tracts covered at least 40 acres about 2 miles east of the head of Lake Coeur d'Alene. Its age was 99 years and there were 72.4 trees per acre, averaging

Cruise of Two Stands of Even-Aged Second Growth Western Yellow Pine

Area tallied acres	Age yrs.	Av. D. B. H. ins.	Av. Hght. ft.	Trees per A.	Volume per acre: Inside* bark cu. ft.	per cent bark‡	With bark cu. ft.	Bd. ft. Clark†	Mean annual growth: cu. ft.	bd. ft.
5.0	99	15.6	89	72.4	3020	28.4	3880	18,900	39.2	191
4.55	130	20.5	105	50.4	4605	28.3	5910	33,500	45.5	258

*From form class volume tables by C. E. Behre.

‡From sample plots, based on mean sample trees.

†Ratio of bd. ft. to cu. ft. taken from S. B. Show, Yield Table for Second Growth Yellow Pine in Calif., for stands of same age with trees of same size.

15.6 inches in diameter breast high and 89 feet in total height. The largest trees tallied measured 26 inches in diameter. On this area there were a few scattered veteran trees remaining. These were not included in the calculations altho they occupied some space and serve to reduce the average yield per acre.

The cruise showed a yield of 3880 cu. ft. per acre including only trees 8" or more in diameter breast high. At 90 cu. ft. per cord this is equivalent to 43 cords per acre of fuelwood not including the branches at all. Expressed in board feet in terms of Clark's International Log rule for a ⅛" saw-kerf, this amounts to 18,900 bd. ft. per acre, which is easily equal to the average amount yielded by the virgin stands in the original cuttings. The mean annual growth at 100 years in this stand is therefore 191 bd. ft., 0.434 cords or 39.2 cu. ft. That these figures are conservative is indicated by the fact that the stand was rather open and the cruise showed a density of only 61.5 percent of normal as expressed by the sample plots and that these plots had less than 81 percent of the volume for normal plots of the same age with trees of the same average size measured on the Lassen National Forest in California by S. B. Show.

The second tract for which measurements are available covered several hundred acres just south of Plummer. Much of this stand has been logged recently and cutting is in progress on the remainder at present. This stand is not over 130 years old. Borings taken in some portions of the tract indicated an age of only 120 years, but 130 is taken as the more conservative figure. Large portions of this tract were almost ideally stocked and showed remarkably well what may be expected if protection is afforded young even-aged stands of this species. The accompanying photograph shows a view of this fine stand taken from an opening along the highway. The trees average 20.5" in diameter breast high and 105 feet in total height.

A three quarter acre sample plot measured in the stand shown in the illustration showed 97.3 trees per acre and a yield of about 9200 cu. ft., 102 cords or 52,000 bd. ft. per acre expressed on the same basis as before.

The cruise of this area showed 50.4 trees per acre with a yield of 5910 cu. ft., of which about 17 percent was Douglas fir and western larch. The cordwood equivalent at 90 cu. ft. per cord is 65 cords per acre and expressed in board feet, Clark's International rule for ⅛" saw-kerf, this amounts to 33,500 bd. ft. per acre. The mean annual growth in this stand would therefore be 258 bd. ft., 0.785 cords or 45.5 cu. ft. per acre. Comparing this to the normal as indicated by the three quarter acre sample plot mentioned above we get a density of 64.3 percent and this index plot in turn has only about 74 percent of the volume of fully stocked plots of the same age and size of trees measured in California. These relations are approximately identical with those noted for the first area above.

This stand had been subject to severe reduction in numbers in recent years, not only from natural suppression, but more noticeably from insects and windfall. These agencies had reduced the density far below normal over much of the area, leaving irregular openings and thinning out the stand in the initial stages of the inevitable transition to the many-aged condition of the virgin forest.

A study of the figures for these stands does not give any conclusive information relative to the age at which the maximum average yield will be secured. The mean annual growth of the 130 year old stand is much higher than that of the 100 year old area, but the heavy losses which it has sustained in recent years raises the question whether a higher figure would not have been shown at an earlier date.

In studying the yield of second growth western yellow pine in even-aged stands the very interesting question arises as to how long this intolerant species, which eventually reverts to the many-aged condition, will maintain its even-aged character. Weidman has recommended a change in the system of management for western yellow pine in Oregon based on the premise that the next generation of trees would be even-aged. Show, in California, recommends a clear cutting system for second growth yellow pine and, from studies based largely on even-aged groups selected in the virgin stand rather than actual observation of the development of any particular even-aged stand over a large area, concluded that the cutting age should be about 120 years.

The evidence of the 130 year old stand presented here would tend to substantiate the results of the work in California, not on the basis of culmination of mean annual growth, but because the condition of the stand indicates that it is losing its even-aged character and that over large areas the losses through opening up of the stand would more than balance the growth after about 120 years. However, this evidence is by no means conclusive;

the behavior of other stands must be studied if they can be found. It may even prove exceedingly difficult to maintain the even-aged stands intact up to 120 years, because of the losses which will be suffered from insect attacks at earlier periods. Many instances of the breaking up of large bodies of young second growth yellow pine by insect infestation in spots have been observed and unless this can be controlled the forces tending to transform the even-aged second growth into stands of many ages by groups will be at work long before the new crop could reach maturity.

Second Growth Western Yellow Pine.
52,000 board feet per acre at 130 years of age.

One point which the study of these stands seems to indicate quite clearly is the nature of the reduction factor which must be applied to a normal or index yield table to get results attainable in practice. The figures given above show that these two areas have only from 61 to 64 per cent of the normal indicated by selected sample plots and only 48 to 50 per cent of the yields for similar conditions indicated in the California yield table. The fact that yellow pine stands may be seriously opened up in spots by insect attacks at almost any period of their development, however, indicates that the conventional method of using the reduction percent of a young stand to predict its relation to normal yields in the future is exceedingly dangerous. To meet this condition empirical reduction factors for different ages, based on the measurement of selected stands, such as those presented here, may prove of considerable value and also serve to show how long western yellow pine stands may profitably be maintained in even-aged condition.

THE TALE OF A CAPTIVE BULL MOOSE CALF

By FLOYD M. COSSITT, '24

Indian Lake is one of those picturesque little bodies of snow fed water that one finds high in the mountains of the Selway National Forest. Surrounded by open patches of meadows and partially timbered slopes, the lake itself does not cover an area of more than 100 acres and varies in depth from a few feet at the upper end to over 20 feet at the lower end. Conditions are most favorable for the growth of the heavy mat of tangled grass and moss which covers the entire lake bottom.

During the summer months, from the middle of July until late in September, the few survivors of the once great herds of moose frequent the shores of Indian Lake. The open meadows and uplands afford a summer range where, protected by the game laws, they may rear their young unmolested and build up a store of strength for the winter months.

From the Ranger Station, a hundred yards or so from the lower end of the lake, it is not an uncommon sight to see as many as two or three moose diving or splashing about in the cool water seeking the tender shoots of grass on the lake bottom. These tender morsels they prize very highly. One cow in particular was very regular in her visits to the lake. She came when the shadows began to lengthen in the afternoon, and stayed on until it was dark. She became accustomed to the men at the Ranger Station, and if they maintained a discreet distance, she never showed signs of fright.

Late in the month of July something in her

worried actions led the men to believe that she had hidden a calf somewhere along the lake shore. Tom Alexander, one of the men from the station, found the little fellow lying helplessly upon his back, wedged in a small ditch and all but dead. Evidently the mother had left him there while she indulged in her daily swim and from the trodden condition of the ground about him, her efforts to extricate him from his precarious position had been futile.

The discovery of the little fellow immediately suggested the idea of nursing him back to health and of taking him out to civilization. It was necessary to construct a stretcher of poles and canvass to transport the calf to the station, for after lying for at least 24 hours upon his back, he was unable to stand without support. A diet of mare's milk and a particular species of fireweed soon put the little fellow on his feet again.

In view of the scarcity of moose in the west, the game department of the State of Idaho, learning of the capture of this calf, expressed a desire to secure him for the zoological garden in the park at Boise, Idaho, and accordingly took over the care of the calf. Instructions were given to take him to Hamilton, Montana.

By this time "Bull," as he was affectionately nicknamed, was very much alive and able to frisk about at the end of his tether rope. He was of a very tempermental disposition and hard to befriend. It was expected that perhaps his mother would try to reclaim him, but if she ever did recognize her progeny, the man smell probably kept her away.

The trail to Hamilton, Montana, is a typical mountain trail, traversing some of the roughest country in the Bitterroot Mountains and a hard trail for man or beast. Preparation for the trip was completed about the fifth of September when Bull was quite able to travel if it so suited his fancy, and a grand start was made for Hamilton. Considering the fact that Bull was being led away from his natural surroundings, he travelled very well the first day. Considerable progress was made with Bull trailing quietly at the end of his rope and evincing little interest in his new surroundings.

Such angelic behavior on the part of Bnll was too good to be lasting. On the following morning in spite of all the coaxing and enticements which could be conceived for a moose calf, Bull refused to move. However, he was finally persuaded to make a reluctant start down the trail. After about twenty minutes of slow travelling, the trail unfortunately passed through a most luxuriant field of Bull's favorite brouse, the fireweed. He deliberately laid down and proceeded to complete his breakfast. Now with a full stomach, after eating his fill, he became sleepy, and after all efforts to move him had failed, camp was made for the balance of the day.

From then on, travel became most painfully slow and exasperating, and an average of one mile per day was all the progress possible for a number of days.

After the men had about exhausted their store of patience and used up much of their strength in futile attempts to coax, persuade or force Bull into travelling, they built a travois of poles, hitched a horse to the contrivance and completed the trip to Hamilton without further incident. However, it would seem that it was ordained by the Great Spirit that Bull's presence was not to grace the parks of Boise, for, as a result of a fatal feeding of overheated milk, Bull's travels were brought to an abrupt and tragic close, soon after the arrival of the little caravan in Hamilton. Although many were deprived of an opportunity to view at close range a moose, native to the State of Idaho, Bull's spirit is probably more free to roam the mountains of his home in the Selway National Forest than his spirit would have been behind the bars of the zoo in Boise.

"BULL"

Captive Moose Calf at Indian Lake, Idaho

GRAZING RECONNAISSANCE

By C. W. WATSON, Instructor in Forestry

Most of the forage in the National Forests lies in mountainous areas at high elevations and constitutes what is known as the summer range. This range is usually inaccessible for stock in winter because of snow. Its period of use runs from May to November or for a shorter season, depending on altitude. The fresh forage of these high ranges is very valuable for the stock which probably has been spending the winter eating hay in the feed lots or grazing the dried forage of winter range which may be utilized during that period because of a lower altitude and less snow.

Past use of the ranges has very often resulted in deterioration caused by grazing too many head of stock or putting the stock on the range too early in the season. The policy of the Forest Service is one of continued use to full capacity and this means that the range should be so used that its production of forage will not decrease in quantity or quality. To this end many studies have been made and many data collected, facilitating the formulation of the principles of range management and their application. The most useful and scientific attempts to analyze and record range conditions have taken the form of range or grazing reconnaissance—a systematic study of field conditions in reference to every factor which might have any practical bearing on the management of the range.

Grazing reconnaissance is primarily a survey of forage resources and includes the mapping of various types of forage and poisonous plants, the estimation of its quantity and quality, its seasonal development, etc. The present condition of the range is noted, as well as the occurrence and nature of the water, and descriptions are made of the forest cover, topography, fences, salting places and game animals using the area. Before a range study can serve as a basis for management, it must answer four questions: (1) What kind of stock is the range best adapted to? (2) How many head can be run on the range in its present condition? (3) How early in the summer will the stock be allowed to come onto the range and when will they be taken off? (4) Is the water sufficent and so located that the range can be utilized? There are other points upon which information is unually desired but, when sufficient data have been collected to answer these four questions, an initial management plan may be worked out with considerable accuracy. I say an initial plan because it is almost certain that any untried plan would have to be changed to conform to the reactions of the stock and their influence on

Sheep on Timbered Range in Idaho

the range when the scheme of management was first tried out. Practical application is the best criterion.

The field work of reconnaissance is accomplished during the summer months and early fall, often while the stock are utilizing the range. The data are collected by running parallel compass lines one half mile apart, the field man mapping and writing up descriptions as noted along these lines. The men usually work alone. The crew may consist of four or more members and a cook—the latter a most important person. The party chief is a Forest Service official, as occasionally are some other members of the crew. Frequently forest school students are hired for this work if they have the proper qualifications. To make good on reconnaissance, a man should have some knowledge of systematic botany and forest surveying, especially the use of the compass and pacing. He should understand the rectangular system of surveying used by the General Land Office in the West. Moreover, he should be a congenial worker, of good physique and an excellent hiker because much of the work may be done on foot. These qualifications are essential. If, in addition, he be a good woodsman with some knowledge of stock and game, horse packing and cooking, his success should be assured.

For a student interested in range management of stock or in grazing problems, service on grazing reconnaissance will compensate him remarkably well. He will have an opportunity to gain an intimate knowledge of the conditions on the great stock ranges and an understanding of the problems and their solution which will be for him a firm foundation for further work along grazing lines. For the individual with the proper qualifications who suspects but has not confirmed his interest in matters pertaining to grazing, a season spent on reconnaissance offers splendid, healthful work and a comprehension of the wild ranges where our great western stock-raising industry was born and has developed and on which it relies for its maintenance.

Cattle on National Forest Range

THE SONG OF THE WANDERER

With my knife and gun and blanket
And some coffee in a sack—
With my free soul just a-roaming
And no burdens on my back—
With just miles of trail behind me
And just miles of trail ahead
Toward the mystery land o' future
My wand'ring feet must tread.
So I leave the past a-fading,
Meet the present with a smile,
And just dream of what's a-coming
At the end of every mile.

Stanley Foss Bartlett.

THE SCHOOL OF FORESTRY, 1922-1923

By C. EDWARD BEHRE
Associate Professor of Lumbering

The past year has been one of continued progress and accomplishment for the Idaho School of Forestry. There were no changes in the teaching force which means increased stability and better quality of instruction in all courses. The enrollment in the regular curricula was especially gratifying this year in that it exceeded any previous registration and showed a better distribution of the men among the different classes. There were 7 seniors, 8 juniors, 17 sophomores, 26 freshmen, 9 rangers and 13 unclassified, making a total of 80 regularly enrolled men exclusive of those from other department and those taking the correspondence course in "Lumber and Its Uses."

Closing the Vocational Course.

The 13 unclassified students represent the last of those in the special course for Federal Vocational Rehabilitation students. After next year this course will be discontinued altogether and thus permit a greater concentration of effort on the part of the faculty upon the regular courses. The record being made by many of those who took Vocational Training in forestry at Idaho reflects credit upon the school and assures us that our efforts in providing this work for vocational trainees was well worth while. Although a great many vocational men came to the school with scarcely any foundation and little intention of sticking to forestry, a very good number of them completed the two years of work and have found satisfactory openings in the U. S. Forest Service or elsewhere. As an index of how our vocational men,-all of whom took the rangers examination last fall, compared with the general run of applicants for this position from the entire country, 9 out of 14 or 64.3 percent passed the ranger's examination while for the entire country only 194 out of 726 or 26.7 per cent passed. Those of our men who failed to pass last year were given a new examination this spring from which no returns have yet been received.

Forest Service Lecturers.

During the winter months the regular instruction was supplemented again this year by several series of lectures by officials of the U. S. Forest Service detailed especially for that purpose.

A series of five lectures, supplemented by several reels of motion pictures, dealing with the public relations work of the U. S. Forest Service was presented to the students of the School of Forestry during the week of January 22 by Theodore Shoemaker, U. S. Forest Service, Missoula, Montana. The motion pictures were open to the public and attracted a large audience and much favorable comment upon the work of the Forest Service. The first of these pictures entitled "When Elk Come Down" presented in a very fascinating and convincing manner the problem of saving the elk in the Yellowstone National Park region from extinction by providing adequate winter range and protection against "tooth hunters." The second film entitled, "Mountains and Meadows" showed some of the wonderful scenic resources of the National Forests off the main routes of travel with an invitation to everyone to make full use of these great public properties and aid in their protection. The scenes were taken in the Gallatin National Forest and included one reel of pictures of the Bozeman round-up.

Mr. J. W. Girard, Logging Engineer, U. S. Forest Service, Missoula, Montana, gave a series of ten lectures during the week of March 5 covering timber appraisals and logging cost studies. Mr. Girard is a recognized authority on these subjects and presented at first hand, methods of training timber cruisers and of analyzing the costs of logging operations which he had worked out himself and used successfully for a number of years. The material of Mr. Girard's lectures and the enthusiasm with which he presented them constituted a real inspiration to all the students who heard him and especially to those contemplating logging engineering as a profession.

A third series of lectures on problems of personnel in the U. S. Forest Service was given during March by Mr. H. C. Shepard, Supervisor, Boise National Forest, Boise, Idaho. Mr. Shepard discussed the qualities which fit a man for Forest Service work and lead him to success and then outlined the systems in use for following up the accomplishments of the various members of the organization, planning the work to be done on each district in

advance, and in other ways improving the efficiency of operation. In his final lectures Mr. Shepard took up grazing on the National Forests and discussed a few of the problems arising from the use of the national forest range.

The students of the School of Forestry were given a vivid picture of the seriousness of insect losses in the forests of the northwest in a special lecture during April by Mr. James C. Evenden, Forest Entomologist, Forest Insect Field Station, U. S. Department of Agriculture, Coeur d'Alene, Idaho. In addition to this lecture Mr. Evenden presented to the public here a fine series of lantern slides and, at a later date, a motion picture showing examples of insect depredations in the forests and methods being used to control them.

Watson on the Spokane meeting of the National Wool Growers Association.

At a special meeting, May 17, held in the Sigma Alpha Epsilon house, Mr. Watson gave a demonstration of camp cooking, Howard A. Gatley gave instructions in first aid methods, Floyd W. Cossitt gave a short talk for the benefit of those going out into field work in the Forest Service for the first time this summer, and Mrs. Behre furnished refreshments.

The social activities of the club were as successful as in previous years. The "Timberbeast Hoedown" and the annual banquet are reported in detail elsewhere. An innovation in the activities of departmental clubs on the campus this year was the informal "Waffle Feed" held at Huff's Cafe early in December. This affair was well attended and helped considerably to stimulate interest in the club and promote a more united spirit among the forestry students.

Class in Forest Surveying with Traverse Boards

The Associated Foresters

The forest club of the students of the Idaho School of Forestry, known as the Associated Foresters, has also had a successful year. The meetings for the most part were held in the University Hut, where refreshments could be served at the close of the regular meetings. The programs included a talk by Dean F. G. Miller on the prospects of the school for the year; an outline by Professor C. E. Behre of the proceedings of the Pacific Logging Congress at Tacoma, Washington; a talk by P. D. Sharma on his experiences with the white pine blister rust control work and at the Priest River Experiment Station; a summary by Dr. Henry Schmitz of the Land Use and White Pine Blister Rust Conferences of the Western Forestry and Conservation Association at Portland, Oregon; and a report by Mr. C. W. Watson on the Spokane meeting of the National Wool Growers Association.

A School Forest

Plans have been under way for the past year to secure a section of land not far from Moscow suitable for a demonstration and experimental forest. In order to be of maximum use for class instruction purposes such a tract should be easily accessible to the school, and with this in mind a section of University land six miles from Moscow has been selected. This tract is not much over a mile from the state highway between Moscow and Viola and can be reached at almost any season of the year. It has all been logged off and a portion of it burned rather severely after logging but it is admirably suited to silvicultural investigations. For the most part this section

Associated Foresters, University of Idaho, 1922-1923

is reproducing to a dense stand of western yellow pine except on the northern slopes where the young stuff is a mixture of Douglas Fir, western larch, western yellow pine and white fir. Many of these young stands are already in need of improvement cuttings and thinnings and the burned area will afford ample opportunity for experiments in artificial reforestation. A plan to secure this section for the permanent use of the School of Forestry has been presented to the Board of Regents and action is expected in the near future.

Adjoining the section mentioned lie other areas of fine young western yellow pine which it is hoped may be acquired later on to round out the holdings and afford better opportunities for studies of growth and permanent sample plots.

New Wood Collections

The School of Forestry has recently acquired through the courtesy of the Bureau of Forestry of the Philippine Islands a complete, well labeled set of 130 different native Philippine woods. The Forest Research Institute of Java has also furnished a display of 18 woods from that country. These collections improve considerably the equipment ot fhe school for work in wood technology.

Forestry Exhibit at State Fair.

A very interesting and striking display of publicity material was sent by the Idaho School of Forestry to the State Fair at Boise and to the State convention of the Federation of Women's Clubs at Burley last fall. The display consisted of a collection of unusual products made from wood; another collection and diagram showing the great variety of the chemical products derived from wood, a large chart in the form of a tree showing the activities of the Forest School and the opportunites open to trained foresters; a set of publications of the School of Forestry; a wonderful assortment of photographs of the white pine forests of the state and a chart showing the importance of the forest industries to the state and the necessity of protecting the forests from fire.

Forestry Legislation

Before the meeting of the state legislature last winter a representaive committee headed by Dean F. G. Miller held several meetings, discussed all phases of the forestry situation in the state and framed a forestry bill which was presented to the senate but failed to pass. The three chief features of the proposed legislation were (1) Provision for a state board of forestry and a state forester, (2) Provision for compulsory patrol of all timber lands of the state and extension of the fire districts to cover the entire state and make more effective the burning permit law, (3) A more adequate slash disposal section which would have required piling and burning along areas of special hazard and elsewhere under certain conditions and would have provided for slash disposal on areas on which only a part of the timber had been removed. The urgent need for more adequate forest legislation in Idaho is recognized and the School of Forestry accepts as one of its legitimate functions the molding of public opinion and aiding in the framing of such measures as will lead to the conservation of the forest resources of the state.

Forestry Program at Sigma Xi

On April 23, the Idaho Chapter of Sigma Xi held an open meeting at which a forestry program was presented by the faculty of the School of Forestry. Dean F. G. Miller outlined the forestry situation in North Idaho showing by charts and maps, the ownership of forest lands and standing timber, the rate at which they are being cut over and the dependence of many of our communities upon the lumber industry for their existence. Professor C. E. Behre then showed by a series of lantern slides the results of uncontrolled cutting followed by broadcast burning of slash or fires in the white and yellow pine types of Idaho and how the cuttings could be conducted and brush piled and burned in order to provide a new crop of timber for the future. Dr. Henry Schmitz closed the program with a paper showing the importance of forest products in the everyday life of the nation and the need for investigation to improve methods of utilization and make new products available on a commercial scale.

Spring Field Trip

The annual logging engineering field trip was made this year to the operations of the Edward Rutledge Timber Company at Clarkia, Idaho, during the week of May 21. Eight upperclassmen accompanied by Professor C. E. Behre made the trip which included a short inspection of the sawmill of the Potlatch Lumber Co. at Potlatch, and of the cedar yards of the E. T. Chapin Company at Bovill, in addition to the detailed study of the logging operations at Clarkia. The operations of the Edward Rutledge Timber Company were especially suited for a trip of this kind as in the short time available the students were able to study practically every method of logging in-

cluding the drive on Marble Creek, the incline railroad, chutes and several phases of power logging.

Toots-E

Through the courtesy of the C. N. Lovsted Company of Seattle, Washington, the School of Forestry has been given the use of one of the popular electric logging signal whistles, known as "Toots-E," for instructional and demonstrational purposes. The students have adopted a novel method of becoming familiar with the installation and operation of this signal whistle by installing it on top of the university heating plant, wiring it to the gymnasium and athletic field and using it to announce and broadcast the victories of the Idaho athletes.

Dr. Schmitz Honored by A. A. A. S.

A few months ago Dr. Henry Schmitz, Associate Professor of Forest Products, received the honor of being made a Fellow of the American Association for the Advancement of Science in recognition of his studies in wood decay which have been in progress for several years. Several bulletins have been published as a result of his research and these have been in demand from all sections of the country.

Publications

During the past year a number of important papers have been prepared for publication as a result of research by the faculty of the School of Forestry. The work of Dr. Schmitz has yielded four papers which will appear shortly in various technical journals and a bulletin which will be published this summer by the School of Forestry. The titles of these and the names of the journals in which they appear follow:-

Logging Engineering Class in Camp

White Pine Blister Rust Cooperation

The School of Forestry has been able to render a valuable service to the state in the active part it has taken in the campaign to prevent the entrance of the White Pine Blister Rust into Idaho. Dr. Henry Schmitz, has been directing the control work in Idaho in cooperation with the U. S. Bureau of Plant Industry, the North Idaho Forestry Association and the State Department of Agriculture. Last summer Dr. Schmitz had charge of a crew of six men who scouted the entire state for black currant bushes, and a crew working on the eradication of black currants is again in the field under his direction for the present season.

Preliminary Note on Physiological Specialization of Fomes pinicola—to appear in "Science."

Studies of Wood Decay IV. The Effect of Sodium Carbonate, Chloride and Sulphate on the Rate of Decay of Douglas Fir Sawdust Induced by Lenzites saepiaria, Fr. with Special Reference to the Decay of Wood in Alkali Soils,- to appear in "American Journal of Botany."

Notes on Wood Decay I. Wood Destroying

Properties of Polyporus volvatus, Pk.,- to appear in the "Journal of Forestry."

Note concerning Leaf Cast of Larix occidentalis, Hypodermella laricis, Tubeuf, in North Idaho, to appear in "Phytopathology."

Studies in Wood Decay V. Physiological Specialization of Fomes pinicola—to be published as a bulletin of the Idaho School of Forestry. In this bulletin Dr. Schmitz has shown that a fungous like Fomes pinicola which is found upon a number of different tree species as hosts has developed physiological specialization. Whether this specialization is due to host influences or not is not certain. The fact that physiological specialization does exist, however, opens up a large and interesting field of great economic importance because, should it develop that the different strains of the wood destroying fungi are limited to a single host species, the problem of forest sanitation in cuttings of mixed species, where defective inferior species must be left on the ground as a menace to the new crop of valuable species, would be largely eliminated.

Early last fall Dr. Henry Schmitz was called upon to read a paper on the Pine Butterfly, which made serious inroads on the forests of Idaho last summer, before the North Idaho Forestry Association in Spokane. Following this meeting Dr. Schmitz prepared an article on the Pine Butterfly Epidemic in the West in conjunction with Victor Jones of the department of entomology, University of Idaho, which was published in "The Timberman" for January 1923.

The studies of stem form upon which Professor Behre has been engaged for the past two years are beginning to yield results and a preliminary note covering the findings has been submitted to the "Journal of Forestry" for publication in the near future. Professor Behre believes the Hojer formula upon which the form class taper and volume tables in use in Sweden have been based givès values which are not attained by any species which has been studied and he has derived another formula to express the stem from which appears to be much more consistent with nature. It is hoped that these studies of form will be of use in studying the development of second growth stands and stimulated growth after partial cuttings, both of which problems are complicated by changes in form which make existing volume tables of doubtful accuracy.

Last summer Professor Behrè assisted by Harold White, '25, gathered considerable data upon the yield of second growth western yellow pine. This work will be continued this year and in addition a start will be made upon the problem of rate of growth and future yields of the material below merchantable size left after logging in the white pine type.

Results of Tree Planting in South Idaho

During the past summer Dean F. G. Miller made a trip through South Idaho to familiarize himself with the conditions for tree growth and the success attained by tree planting in the past in order to be able to better advise inquiring citizens on the kind of trees to plant in the various localities. The distribution of young trees for shade tree, windbreak and woodlot planting, carried on by the Idaho School of Forestry has attained considerable proportions and it now seems desirable to gather better information on the results to be anticipated. During the coming summer, therefore, Dean Miller will again visit South Idaho, studying methods of planting and measuring the growth of old plantations, many of which have now been growing long enough to show results.

During the past summer Mr. C. W. Watson, of the forest school faculty was a member of a grazing reconnaissance party on the Beaverhead National Forest, Montana. This summer he will be employed by the U. S. Forest Service on range investigations at the Great Basin Experiment Station, Ephraim, Utah. The experience Mr. Watson will gain in this way should be of considerable value in helping him build up the courses in grazing and range management here and in planning investigations he will undertake in South Idaho next year.

The American Forestry Association has recently organized an "Advisory Editorial Council" consisting of representatives from all sections of the country in order to make the editorial department of the "American Forestry" magazine more effective and more representative of important forestry developments for the entire country. Dean F. G. Miller of the Idaho School of Forestry has been selected to represent the states of Idaho and Montana upon this council.

FOREST PROTECTION WEEK

By F. G. MILLER, Dean

The fourth annual Forest Protection Week, April 22 to 28, was generally observed throughout the state. Besides the committee having general charge of the arrangements, committees on school program, speaking campaign, advertising, and the press were appointed, and and each did splendid work.

The school program committe with Dr. Henry Schmitz as chairman, made an effort to reach every school in the state, both in the country and in the towns with an attractive sixteen page folder carrying the proclamations of President Harding and Governor Moore, and containing other material to assist in preparing suitable programs. Each folder was accompanied by a letter from Miss Elizabeth Russum, state superintendent of public instruction, urging upon each school the importance of a proper observance of the week to the end that the forests of the state might be saved from the ravages of fire. Reports from teachers and superintendents show that the suggested program was very generally used.

The folder, togther with a strong letter summarizing the forestry situation in Idaho, written by Professor C. Edward Behre, chairman of the speakers' bureau, was also mailed out by the bureau to boy scout masters and executives, camp fire girls, American legion posts, commercial organizations, women's clubs, rotary clubs, elks clubs, kiwanian clubs, labor leaders and farm bureaus.

The speakers' bureau in cooperation with the Forest Service also organized an extensive speaking campaign, in which the objects and aims of Forest Protection Week as well as the relation of sustained forest industries to the permanent prosperity of the state were generally presented by foresters and others to the above bodies as well as in the public schools.

Reports from about 50 speakers show them to have addressed over 100 organizations, with a total attendance of approximately 12,000. These meeting places represent every part of the state. Doubtless many other meetings were held that have not been reported. In at least one case, that of Mr. Franklin Girard of the Forest Service, the speakers address was broadcasted by radio.

Mr. A. D. Decker of the Potlatch Lumber Company, acted as chairman of the committee on advertising, and at the suggestion of this committee many of the business houses ran forest protection hits in their local advertising and exhibited appropriate window displays. At Orofino, Supervisor Paul A. Wohlen reports that a model of a forest fire and a picture collection were on display during the entire week and attracted wide attention. This committee also secured wide distribution of "forest aide" badges and wind shield stickers and furnished lantern slides to various theatres.

The papers of the state gave very general support to the work of the press committee, headed by Forest Supervisor C. K. McHarg, Jr. of Coeur d'Alene, all of them giving generous space to articles supplied by members of the committee and others. The press matter included many strong editorials.

Altogether it is believed that the people of Idaho were generally reached with the message of forest protection, the place of forestry in the industrial welfare of the state, and the importance of keeping the forest lands stocked with growing trees if our forest industries are to survive.

FORESTERS' ANNUAL BANQUET

The Seventh Annual Banquet of the Associated Foresters of the Idaho School of Forestry took place on the evening of March 14, 1923 at Lindley Hall. Sixty forestry students and their guests sat down to an excellent repast in a hall bedecked with evergreen branches and otherwise appropriately decorated.

Mr. C. W. Watson, Instructor in Forestry, acting as toastmaster added much interest to the program by his clever introductions and replies to the various speakers. The program included short talks by Professor C. E. Behre;

A. D. Decker, Land Agent of the Potlatch Lumber Co.; C. L. Butterfield; E. C. Shepard, Supervisor of the Boise National Forest; A. M. Sowder and J. W. Rodner, of the School of Forestry and Professor C. W. Chenoweth of the university faculty. These talks were interspersed with songs by the Sigma Alpha Epsilon quartet and selections by an instrumental trio consisting of violin, cello and piano.

President A. H. Upham and Senator M. E. Lewis, whose names appeared on the program, were unable to be present, the former being unexpectedly called out of town at the last minute and the latter being detained by business in South Idaho.

Professor Behre gave some amusing reminiscences of his work at the Yale School of Forestry, where he had first made the acquaintance of the toastmaster, Mr. Watson, and of one of the guests, Mr. Decker.

Mr. Decker traced the relationship between the lumber industry and the foresters of the country from the early days and stated that without question the lumber industry would be seeking the services of graduates of the forestry schools in increasing numbers to help work out the big problems of improved methods of logging and milling, utilization of by-products, putting cut-over lands to productive use and maintaining the supply of raw material for the future.

Mr. C. L. Butterfield, introduced as a pioneer in Moscow deeply interested in forestry matters, congratulated the foresters upon their choice of vocation and encouraged them in their work with the counsel that satisfaction with one's work was more to be desired than large material gain with its usual accompaniment of anxiety and care.

Forest Supervisor E. C. Shepard, who had been giving a series of lectures to students of the forest school for the past ten days amused his audience with anecdotes of his experience.

A. M. Sowder, president of the Associated Foresters, outlined the accomplishments of the organization during the year and called upon the students to continue to show their interest in forestry by supporting the club in the future.

J. W. Rodner, apologizing for failure to produce the "Squirrel Fodder" from the Hermit of Hemlock Butte, as scheduled on the program, related the incidents relative to his missing the third annual holdup of the Fernwood Poolhall last summer after having been relieved of his valuables in the two preceding events.

The last speaker of the evening was Professor C. W. Chenoweth, who has for several years spent his summers as smokechaser on the Clearwater National Forest and who last year made himself famous in forestry circles in the Northwest through his publication in "The Idaho Forester" of a humorous article entitled, "The Science of Smokechasing." Professor Chenoweth kept his audience in continual laughter following the story of his initial experience in forest protection work, in which some of those present had figured as his bosses.

At the close of the program everyone present felt that the banquet had been the most successful event of its kind in recent years and the committee in charge, composed of A. M. Sowder, J. W. Rodner, E. T. Nero and Leslie Eddy, deserve much praise and credit.

TIMBERBEAST HOEDOWN

The seventh annual dance of the Associated Foresters, known as the "Timberbeast Hoedown" was held in the University Gymnasium on December 16th and was a complete success. The men decided to discard the customary attire consisting of stag shirt, Malone trousers, and high topped boots and "busted forth" in "civies." Nevertheless the Timberbeasts were conspicuous when the "Timberbeasts Special" rolled around.

Several days before the dance a crew stormed the mountains and returned with several loads of evergreens which were used to transform the cold bare walls of the gymnasium into huge mounds of green. The orchestra, which "put forth" a weird brand of syncopated jazz music, was secluded in a grove of fir trees in the center of the floor, above which beamed throughout the evening a splendid big silvery moon. Evergreen streamers were dropped from one side of the balcony to the other as well as along the edge.

The "Timberbeast's Special" was quite novel and will long be remembered by those who attended. The light was supplied by six camp fires and a flurry of snow descended throughout the dance.

XI SIGMA PI

Founded in 1908 and existing only as a local honor society for a period of seven years, on the University of Washington Campus, Xi Sigma Pi sprang into prominence and became a national honor society in 1915. Since that time, Xi Sigma Pi has grown steadily until at the present time five chapters have been established, reaching from the Pacific Coast to the Atlantic Coast.

Epsilon Chapter of Xi Sigma Pi was established at the University of Idaho in 1920. The membership of Xi Sigma Pi is rapidly increasing and for the near future one can predict an outlook as glowing as that of any other national honor society.

The objects of the fraternity are to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry, and to promote fraternal relations among earnest workers engaged in forest activities. The idea of scholarship and leadership in forest activities has always been uppermost in the selection of members. To further the scholarship idea, the Epsilon Chapter has purchased a bronze scholarship tablet of beautiful and artistic design. Each year there will be engraved on this tablet the names of the students who have attained the highest average in each class for the school year. The tablet will fill a long felt want in the School of Forestry to promote scholarship and, being permanent, will afford a new attraction to our halls.

As much weight is placed upon a man's practical ability, such as adaptabilty to forest work or lumbering, capacity for leadership, and promise of attainment, as is placed upon his scholastic work. By this means of grouping, and by stimulating the desire of the underclassmen for election to the fraternity, it is hoped that the objects of the fraternity may be attained.

To be eligible for membership, a student must have completed two and one-half years of standard college work in an approved School of Forestry, three-fourths of his grades shall have been above 80 percent, and he shall not have received any failures in forestry subjects. He shall also have shown creditable interest and activity in practical forestry work.

New members in Epsilon Chapter for the present year are: Rogers G. Wheaton, '24, transferred from Gamma Chapter, University of Maine; Arthur M. Sowder, '24; and Ralph Space, '24.

PERSONALS

C. E. Favre, M.S. (For.) '15, has been transferred from the Humboldt National Forest to the forest Supervisorship of the Wyoming-Bridger National Forest with headquarters at Kemmerer, Wyoming.

Virgil C. Moody, '17, is a district ranger on the Sawtooth National Forest and may be addressed, U. S. Forest Service, Ketchum, Idaho.

E. C. Rettig, '19, declined an offer of an instructorship in the University of British Columbia last fall in order to remain with the Clearwater Protective Association.

Oscar C. Munson, '21, is now in the Engineering department of the Southern Telephone Co. and his address in 823 S. Union Ave., Los Angeles, California.

Thomas B. Jackson, '19, emigrated from Idaho to California to accept an attractive offer as logging superintendent for the large yellow and sugar pine operations of the California Fruit Growers Supply Company, Susanville, Calif. Before leaving the Edward Rutledge Timber Co., Jackson helped install the new incline railroad at Clarkia, having previously made a trip to the coast to study the various installations of inclines in that region.

Roscoe R. Davis, Ex. '23, has an appointment as Forest Ranger and may be reached through the U. S. Forest Service, Ogden, Utah.

William E. Buckingham, Ex. '22, now has charge of the Mussellshell district on the Clearwater National Forest.

J. P. Drissen, '21, writes from Kirkford, Oregon, where he has been engaged in timber sale administration on the Klamath Indian Reservation, that he will probably have charge of the fire situation on the reservation this summer.

C. R. Patrie, '22, will have charge of experimental eradication of wild currants in North Idaho this summer for the Office of White Pine Blister Rust Control.

James W. Farrell, '22, has been awarded the rank of Forest Examiner and is now stationed

at McCall, Idaho, headquarters of the Idaho National Forest. After his appointment as forest assistant last summer, Farrell was first assigned to the Wyoming-Bridger National Forest for timber salo work and then to the district office at Ogden, Utah, on management plans.

A. N. Cochrell, R. C. '21-'22, has been promoted to position of Fire Assistant of the Clearwater National Forest.

Robert Johanson, R. C. '20-'21, is now ranger in charge of the Cook Mountain district, Clearwater National Forest.

Frank A. Brown, '22, is now employed by the Edward Rutledge Timber Co. near Clarkia, Idaho.

P. D. Sharma, M.S. (For.) '22, returned to his home in India early this year, where he expects to practice his profession. All those who knew Sharma will be interested in the following excerpt from a letter to Dean Miller dated April 5 at Amritsar, Punjab, India:

"This letter I am writing from my home at Amritsar where I am encircled by all the members of my family. I had a wonderful trip on the return journey. My public speaking subject proved a first help at Vancouver, B. C. for I received a gold watch together with some cash in recognition of my three lectures delivered at Vancouver and in the vicinity among Indian Communities for the good of my country. Now there was nothing to fear as regards funds and I got to the Boat Empress of Australia on the 18th of January '23. This Boat I found to be an exceptionally good one and very comfortable. It provides with a nice swimming (bathing) tank, a theater on every other night and there are elevators (lifts) to the different stories of the Boat.

"The Sea was tolerably rough till we reached "Yokohama" (Japan) in 14 days. This seaport looked familiar to me yet my observations were rather different this time. The intensity of land utilization and skilful handling of Agriculture by the "Japs" was a great point of interest to me. At seaports the costs are way higher than inland. I prefer the business methods of America and am prepared to advise the Oriental world to copy U. S. A. methods. The prices are never fixed in whole of the Orient (exceptions are few in case of some good firms) including India, so a customer never knows whether he is robbed, paying little too much or just a due profit.

"Witnessed once more the dense population at Hongkong (China) on the 8th of February '23. It is a wonderful national seaport. The great town on the hill side and the port and big hotel and office buildings at the foot make an excellent scene when there are lights at night. The streets are very active; very noisy with a row of coolies drawing two wheeled "Rickshaws" (rubber tired) and Chinese gentlemen taking their little packets of groceries or meat hanging in one of their hands. It looks clumsy in comparison to neat packing with paper in America. My stay was very very short here as by chance I got a good boat sailing out for Calcutta the next morning so I had to be very busy in order to be able to undertake another journey of nineteen days.

"I stayed at Calcutta for about eight days to do away with the tedium of Boat journey and visited my old friends there. Finally I reached my home town among a big crowd of relatives and friends from far and near who had all come to see me Americanized. "You look white and younger" were the first remarks made by my brethern.

"Young Sharma (my little son) has grown up and now seems a big boy. He asked me whether I had brought for him an American football, as I used to describe the American football game as played at the "U" so he was astonished to see the same kind of football which I had purchased at Calcutta for him. Instead of the game being played in a different manner, he was expecting a different shape in football.

"Though I do not want to close my letter so soon yet I do so simply for I do not want to take much of your precious time while in India we have all the time at our own disposal.

Very obediently yours,
(Signed) P. D. Sharma."

Harvey Ivan Melick, '23, completed his work at the close of the first semester and returned to his home at Nampa, Idaho, in February.

Russell M. Parsons, ex-'23, left school in March to accept a responsible position in connection with the new white pine logging operations of the E. T. Chapin Co. at Weippe, Idaho. He plans to complete his work for graduation next year.

Edwin W. Chamberlain, '25, was accepted for entrance into the U. S. Military Academy, West Point, N. Y. and accordingly withdrew from the University early in March.

George J. Madlinger, ex '24, returned to his home last fall and has been taking the course preparatory to forestry at Yale University this year.

Frank B. Folsom, Voc. '20-'22, was married last summer to Miss Ethelyn Nankervis of Moscow and is now a forest ranger on the Colville National Forest, Republic, Washington.

Norman F. Taylor, Voc. '20-'22, has also been in charge of a ranger district on the Colville National Forest, but it is reported that he may have to give it up because of his health.

Stanley Bartlett, R. C. '21-'22, has been employed by the U. S. Department of Agriculture on forest insect work in New Jersey, but expects to return to the Maine woods for the summer.

Paul Bieler, R. C. '21-'22, has been employed as a draftsman and map copyist in the office of engineering, U. S. Forest Service, Ogden, Utah.

Robert A. Miller, ex '22, is manager of the National Park Lumber Company's retail yard at Arco, Idaho.

A. S. Daniels, '23, has a very attractive position in the engineering department of the National Lumber & Creosoting Co. at Texarkana, Texas.

Paul Gerrard, '23, will resume his duties as Fire Assistant on the Clearwater National Forest immediately after completing his course this spring.

Edward T. Nero, '23, will also return to the Clearwater National Forest where he holds an appointment as ranger, after commencement. With Leslie Eddy, '24, who has also a ranger position, Nero will be engaged on special work with headquarters at Orofino.

The Clearwater National Forest will also take Fred Shaner, as assistant ranger for the Cook Mountain District, L. E. Spence (R. C.) for trail construction and Lewis Cummings, '25, Emera W. Renshaw, '25, Kester D. Flock, '26, and LeRoy W. Lewis, (R. C.), for protection work.

Cecil C. Ryan, '23, and Elva A. Snow, '24, are engaged for the summer on the work of White Pine Blister Rust Control which will this summer concentrate on eradication of black currants throughout the state.

Floyd W. Cossitt, '24, will return to his ranger district on the Selway National Forest for the summer.

Ralph Hand, R. C. '20-'22, is now in charge of the Lochsa district of the Selway National Forest.

Others going on the Selway for the summer are Howard A. Gatley, as assistant ranger and Charles W. Hall, '26, and Wm. Pelinka, (R.C.) for protection work.

Ray S. Ferguson received an appointment as ranger on the Selway immediately upon completion of his vocational training here at Moscow.

Ralph Space, '24, will be a member of a party engaged in an extensive reconnaissance of the Selway National Forest this summer.

Jack W. Rodner, '24, is again with the Coeur d'Alene Timber Protective Association for the field season. This year he has charge of all the grazing work of the association.

Arthur M. Sowder, '24, plans to make a trip to the coast this summer to gain experience in the logging camps of that region.

Rodgers G. Wheaton, '24, and John H. Zuver, II, '25, will work with Professor C. E. Behre, upon mensuration and management studies of Western Yellow and White Pines this summer.

Don C. Fisher, '25, had to leave school in April in order to undergo a serious operation in which one of his kidneys was removed. He returned to Moscow recently but will probably have to drop forestry because of his physical condition.

Paul M. Harlan, '25, will spend the summer in the logging operations of the Potlatch Lumber Co. at Elk River, Idaho.

D. S. Man, '25, plans to spend the summer at Vancouver, B. C. where he has many acquaintances. He expects to work in a sawmill there.

M. S. Melick, '25, who spent last summer on timber sale administration on the Washakie National Forest, Lander, Wyoming, will return to take up the same work this season.

Frank B. Moore, '25, has a job for the summer with the Hammond Lumber Co. at Eureka, California.

Henry Q. Nicol, '25, plans to do some "gyppo" logging for the Edward Rutledge Timber Co. at Clarkia, Idaho, this summer.

Harold Z. White, '25, had to drop out of school for the second semester for financial reasons and has since been employed by the Edward Rutledge Timber Co., Clarkia, Idaho.

Guy V. Williams, ex-'25, left school early in the year and has been working in the Barber Mill of the Boise-Payette Lumber Co.

Donald S. Coolbrath, '26, is engaged for the summer on the Kaniksu National Forest, Priest River, Idaho.

Warren H. Bolles, '26, has a job for the summer on the Payette National Forest.

William G. Guernsey, '26, and Neal D. Nel-

son, '26, will go to the Coeur d'Alene National Forest for summer work.

Clarence C. Olsen, '26, will attend the University summer session at Moscow.

Arch M. Sams, '26, will spend the summer with Dean Miller, studying growth and results of tree planting in South Idaho.

Joseph H. Hamel had to leave before the termination of his vocational training period because of poor health. He has been in the hospital at Walla Walla, Wash., and writes that his condition is improving.

L. H. Melchisedeck will take placement training on the Deschutes National Forest, Bend, Oregon, this summer.

Victor Runberg, became the proud father of a fine pair of twins, a boy and a girl on May 11. He will be employed as a grader in the Hedlund Box and Lumber Co., Spokane, Wn., during the summer.

L. H. Garver (R. C.) has an appointment as district ranger on the Weiser National Forest at Indian Valley, Idaho.

William L. Kiser, (R. C.), and Frank Youngblood (R. C.) have jobs on the Boise National Forest.

France Reuterskiold, having coompleted his vocational training period, will be employed for the summer on the Oregon National Forest, District 6, at Cascade Locks, Oregon. He was married to Miss Bernice Burnham of Culdesac on May 26. Hearty congratulations.

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1922-23. The information after each name is in the following order: 1, name; 2, home address; 3, fraternity; 4, honorary fraternity; 5, scholastic achievements and athletics.

SENIORS

Baumann, Herman, Milwaukee, Wisconsin; Sigma Alpha Epsilon; Alpha Zeta; Xi Sigma Pi; President, Associated Foresters 1921-22; Business Manager, "Idaho Forester" 1923.

Daniels, Albert Stanley, Bay City, Michigan; Phi Gamma Delta; President Associated Foresters, 1919-20; Glee Club, 1921-22.

Gerrard, Paul H., Vancouver, Washington; Beta Theta Pi; Xi Sigma Pi; Alpha Zeta.

Melick, Harvey Ivan, Nampa, Idaho.

Nero, Edward T., Moscow, Idaho.

Parsons, Russell M., Moscow, Idaho; Beta Theta Pi; Xi Sigma Pi; Ass't Business Manager "Idaho Forester" 1922; Vice-President Associated Foresters, 1922-23; Editor "Idaho Forester" 1922-23.

Ryan, Cecil C., Moscow, Idaho; Kappa Sigma.

JUNIORS

Cossitt, Floyd Morgan, Weiser, Idaho; Elwetas; Xi Sigma Pi.

Eddy, Leslie Eugene, Moscow, Idaho; Business Manager, "Idaho Forester" 1922; Secretary-Treasurer Associated Foresters, 1922-23; Associate Editor "Idaho Forester" 1923; Baseball "I" 1922 and 1923.

Krim, Ben, Newark, New Jersey.

Rodner, Jack W., Moscow, Idaho; Sigma Alpha Epsilon; Vice-President Associated Foresters, 1921-22; Associate Editor "Idaho Forester" 1921-22 and 1922-23.

Snow, Elva A., Boise, Idaho; Kappa Sigma; Baseball "I" 1922 and 1923.

Sowder, Arthur M., Coeur d'Alene, Idaho; Sigma Alpha Epsilon; Xi Sigma Pi; President, Associated Foresters 1922-23; Track "I" 1923.

Space, Ralph, Weippe, Idaho; Xi Sigma Pi.

Wheaton, Rodgers Gainey, Springfield, Mass.; Sigma Nu; Xi Sigma Pi.

SOPHOMORES

Behre, Mrs. Vernice, Moscow, Idaho.

Chamberlain, Edwin William, Moscow, Idaho.

Cummings, Lewis, St. Petersburg, Florida.

Fisher, Don C., Grangeville, Idaho.

Fuller, Harry E., Emmett, Idaho.

Greene, Edwin G., Moscow, Idaho.

Gudmunsen, Orin Sylvester, River Falls, Wisconsin; Phi Alpha Psi.

Harlan, Paul McLean, Jackson, Tennesee; Kappa Sigma; Alpha Zeta; Glee Club, 1922-23.

Kent, Howard A., Bonners Ferry, Idaho; Kappa Sigma.

Man, Dasaundha Singh, India.

Melick, Marshall S., Bethlehem, Pennsylvania. Glee Club 1921-22.

Moore, Frank B., Muscatine, Iowa; Phi Delta Theta.

Nicol, Henry Q., Moscow, Idaho; Elwetas.

Renshaw, Emera Wolfard, Kamiah, Idaho; Phi Gamma Delta.

White, Harold Z., Moscow, Idaho.
Williams, Guy V., Boise, Idaho; Sigma Nu.
Zuver, John H. Jr., South Bend, Indiana; Sigma Alpha Epsilon; "University Argonaut" staff 1923.

FRESHMEN

Bolles, Warren H., Little Valley, New York.
Bucklin, Ted, Idaho Falls, Idaho; Beta Theta Pi.
Callender, William C., Boise, Idaho.
Callison, Norla, Kendrick, Idaho.
Connors, John D., Prichard, Idaho; Sigma Nu.
Coolbrath, Donald Stuart, Brimfield, Mass.
Field, Walter D., Huston, Idaho; Phi Delta Theta.
Flock, Kester D., Spokane, Washington; Beta Theta Pi.
Gerhart, Carl William, Merrill, Wisconsin.
Godden, Floyd, River Falls, Wisconsin.
Guernsey, William Gano, Millbrook, New York; Phi Delta Theta.
Hall, Charles Wesley, McMinnville, Oregon.
Howard, Kenneth Clinton.
Johnson, Richard D., Poughkeepsie, New York; Phi Delta Theta.
Jungquist, Carl A., Pacific Junction, Iowa.
Lansdon, William H., Boise, Idaho; Phi Delta Theta.
Lawrence, H. Wayne, Jerome, Idaho.
Lundburg, Wendell Stanley, Idaho Falls, Ida.
Montroy, Edward H., Bryant, Washington.
Nelson, Neal D., Heyburn, Idaho; Phi Alpha Psi.
Olcott, Kenneth Merle, Allegan, Michigan.
Olsen, Clarence C., Seattle, Washington.
Payne, Hanley H., Idaho Falls, Idaho; Beta Theta Pi.
Sams, Arch Myron, Skamania, Washington.
Thometz, Gene Joseph, Twin Falls, Idaho; Phi Delta Theta.
Toole, Arlie, Marshfield, Oregon.

UNCLASSIFIED

Autrey, Lawrence, Hauser Ferry, Washington.
Clark, George W., Toushet, Washington.
Eby, Lester W., Walla Walla, Washington.
Ferguson, Ray S., Clarkston, Washington.
Gatley, Howard A., Washington, D. C.
Hamel, Joseph Henry, Bremerton, Wash.
Higgins, Howard H., Fredericktown, Ohio.
Luby, Lawrence L., Idaho Falls, Idaho.
Melchisedeck, L. H., Moscow, Idaho.
Reuterskiold, France, Ft. Atkinson, Wisconsin.
Runberg, Victor, Potlatch, Idaho.
Shaner, Fred William, Asotin, Washington.
Willey, Lewis Edwin, Thornton, Washington.

RANGERS

Braun, Otto, Burley, Idaho.
Garner, Lawrence Henry, Midvale, Idaho.
Kiser, William L., Weiser, Idaho.
Knapp, Russell Manley, Moscow, Idaho.
Lewis, LeRoy W., Weippe, Idaho.
McKinney, Clark P., Salmon, Idaho.
Pelinka, William, Chicago, Illinois.
Spence, Liter Estill, Park Ridge, Illinois.
Youngblood, Frank, Meridian, Idaho.

ALUMNI AND FORMER STUDENTS

The following list of alumni and former students is not complete. Additions and corrections of addresses given will be appreciated as we desire to keep a complete and accurate list of all former students.

Allen, Thomas William; Ex-'22.
Anderson, Mark, Ex-'15,Provo, Utah; (Hotel Manager.)
Ashton, Alan White, Ex-'22.
Barger, Harold B., Ex-'17; Browning, Mont.
Bartlett, Stanley Foss, (R. C.) '21-22; Locke Mills, Maine.
Bedwell, Jesse Leonard, '20 B. S. (For.); Council, Idaho. (Ranger, U. S. F. S., Caribou National Forest, Antelope, Idaho.)
Berry, Waldo Lee, (R. C.) '15-'16; Post Falls, Idaho.
Bieler, Paul, (R. C.) '21-22; U. S. Forest Service, Ogden, Utah.
Brockman, Cecil C., Ex-'23; Bickelton, Wash.
Brown, Frank A., '22 B. S. (For.); 308 State Street, Boise, Idaho.
Buckingham, William E., Ex-'22; Gifford, Idaho; (Ranger, U. S. F. S., Orofino, Idaho).
Burns, Robert Owen, Ex-'15; Payette, Idaho; 625 Hoymount, Fayelleville, N. C.
Cable, Guy Burr, Ex-'22; Roberts, Idaho.
Carlson, Oscar; '15 B. S. (For.), deceased.
Chamberlain, Edwin William; Moscow, Idaho.
Chamberlain, Cecil; Kendrick, Idaho.
Chamberlin, Fred; Ex-'23; Coeur d'Alene, Ida.
Chamberlin, Gail B.; Ex-'22; Coeur d'Alene, Idaho.
Cochrell, Albert N.; (R. C.) '22; (Fire Assistant, U. S. F. S., Orofino, Idaho.)
Cook, Jacob Miller; Ex-'20; Oberlin, Kansas.
Cooper, Alfred; Ex-'20; Los Angeles, Cal.
Core, Glenn R.; Ex-'23; Burley, Idaho.

Cowan, Talmadge D.; (R. C.) '15-'16; (Ranger, U. S. F. S., Targhee National Forest, St. Anthony, Idaho.)

Cross, Sidney W.; Ex-'23.

Cunningham, Russell N.; '17, B. S. (For.); (U. S. F. S. Missoula, Mont.)

Darnall, Glenn McClellan; Ex-'16; Payette, Idaho.

Darrah, Lionel Leonard; (R. C.) '20-'21; Moscow, Idaho; (Farmer.)

Dart, William Ellisworth; Ex-'20; Moscow, Idaho; (Farmer.)

Daugherty, Charles Ira; Ex-'22; Challis, Ida.

Davis, Roscoe Richard; Ex-'21; Star, Idaho; (Ranger, U. S. F. S. District 4.)

Decker, Arlie Delos; '13; B. S. (For.); M. F. Yale University, '17; (Land Agent, Potlatch Lumber Co., Potlatch, Idaho).

Denning, Steward K.; Ex-'13; 3067 Bateman St., Berkeley, Calif.

Dipple, Ralph; Ex-'14; (Dentist, Springfield, Oregon.)

Dodge, Keith Allen, (R. C.) '15-'16; Challis, Idaho.

Doyle, Ivan; Moscow, Idaho.

Drissen, John Philip; '21, B. S. (For.); Harison, Idaho; (U. S. Indian Service, Kirkford, Oregon.

Duncan, Robert; (R. C.) '16-'17.

Edwards, Kenneth D.; Nampa, Idaho.

Eldridge, Ferris Edwin; Ex-'18.

Elhart, Carlton D.; Ex-'22; Caldwell, Idaho.

Evans, Philip Smith; Ex-'20; Preston, Idaho.

Farrell, James W.; '22, B. S. (For.); New Meadows, Idaho; (Forest Examiner, U. S. F. S., McCall, Idaho).

Favre, Clarence Eugene; '14 B. S. (For.); '15 M. S. (For.); (Supervisor, U. S. F. S., Wyoming-Pridger National Forest, Kemmerer, Wyoming).

Fenn, Lloyd Alfred; '11, B. S. (For.); Kooskia, Idaho; (Attorney at Law; Manager, "Kooskia Mountaineer".)

Fields, Charles Carlos; Ex-'14.

Flyg, Carl Jacob; (R. C.) '20-'21; Shelley, Idaho; (Farmer.)

Folsom, Frank B.; (Voc.) '20-22; Elizabethton, Tenn. (Ranger, U. S. F. S., Colville National Forest, Republic, Washington.)

Gavin, C. H.; Ex-'23; Heise, Idaho.

Gildea, Howard Cecil; Ex-'14; McMinnville, Oregon; (Lawyer.)

Gilman, John Elmo; Ex-'19; Obsidian, Idaho, via Stanley.

Griep, Kenneth; Ex-'20; Fruitland, Idaho.

Hallcraft, Vernon Ralph; (R. C.) '20-'22; New Meadows, Idaho.

Hamilton, William Howard; Ex-'22; Santa Paulo, California.

Hammond, George M.; Ex-'20; Pocatello, Idaho; (Bowerman Lumber Co.)

Haladay, Howard Wesley; Ex-'16; Deceased.

Hand, Ralph L.; (R. C.) '20-'22; Ashville, New York. (Ranger, U. S. F. S., Kooskia, Idaho.)

Hanzen, Maurice Henry; Ex-'20; Box 904, Kellog, Idaho.

Hart, Irving Warren; Ex-'22; Boise, Idaho.

Haynes, Ralph M.; (R. C.) '16-'17; Emmett, Idaho.

Headrick, Ralph Alonzo; (R. C.) '16-'17; Moscow, Idaho.

Heard, Herman Claude; Ex-'13; Phoenix, Arizona; (County Agent.)

Helfrich, Will Edward; Ex-'15.

Herman, Charles Henry; '13 B. S. (For.); Enterprise, Oregon; (Manager East Oregon Lumber Co., Enterprise, Oregon.)

Hillman, William P.; Ex-'13.

Hockett, Robert Vestal; Ex-'13.

Holbrook, Frank C.; Ex-'25; San Francisco, Calif.

Humm, Howard M.; (R. C.) '20-'22; Colorado Springs, Colorado.

Humphrey, Clyde Pearson; Ex-'17; Coeur d'Alene, Idaho; (State Highway Department).

Huestis, Clarence; (R. C.) '16-'17; Council, Idaho.

Jackson, Tom B.; '19 B. S. (For.); (Logging Superintendent, California Fruit Growers Supply Co., Susanville, California).

Jensen, Irving R.; (R. C.) '16-'17; Essex, Montana; (U. S. F. S.)

Johanson, Robert; (R. C.) '20-'21; (Ranger, U. S. F. S., Orofino, Idaho).

Johnston, Herbert William; Ex-'17; U. S. Biological Survey, Unalakleet Alaska. (Range Investigations.)

Joke, J. A.; (R. C.) '15-'16; Moscow, Idaho.

Jones, Renaldo Vincent; Ex-'15; Albion, Idaho.

Jones, William McKinley; Ex-'22; Nampa, Idaho.

Kambridge, Antone J.; Ex-'16; Genesee, Idaho; (Farmer.)

Keefe, Frank; Ex-'15.

Kelly, Robert C.; (R. C.) '20-'22; Bradford, Pa.

Keyes, George W.; Ex-'22; Challis, Idaho.

King, Leonard Austin; (R. C.) '20-'21; Orofino, Idaho.

Kingan, Fred; Ex-'22.

Lommason, Thomas; Ex-'17; (Grazing Assistant, U. S. F. S. Ogden, Utah.)

Lundstrum, F. J.; '11 B. S. (For.); 633 Shatto Place, Los Angeles, Cal.

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McNett, Gail Jr.; Ex-'16; Rathdrum, Idaho.

Madlinger, George J.; Ex-'24; Poughkeepsie, New York.

Markham, Murl J.; Ex-'24; Grangeville, Ida.

Martin, Ernest M.; (R. C.) '19-'20; Weiser, Idaho. (U. S. F. S.)

Martin, Paul J.; Ex-'19; Old National Bank Bldg.; Spokane, Wash. (Insurance Business.)

Maruska, Joseph, (R. C.) '20-'21; Sandpoint, Idaho; (Farmer.)

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May, Henry W.; (R. C.) '19-'20.

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Myrick, E. H.; Ex-'17; (Supervisor, U. S. F. S., Lewis & Clark National Forest, Choteau, Montana).

Newkirk, Edwin Ely; (R. C.) '16-'17; St. Louis, Mo.; (Railway Mail Clerk.)

Nonini, Amerigo Louis; (R. C.) '16-'17; Mackay, Idaho.

Oylear, Clarence H.; Ex-'22; Middleton, Ida.

Parsons, Ralph Howard; Ex-'14; (District Ranger, U. S. F. S., Coeur d'Alene, Idaho.)

Patrie, Carthon Roy; Plymouth, Wisconsin; (U. S. Bureau of Plant Industry, White Pine Blister Rust Control, Portland, Ore.

Pederson, Arthur R.; Ex-'22; Kootenai, Ida.

Peterson, Raymond E.; Ex-'24; Moravia, Ida.

Post, Claude H.; Ex-'22.

Poynor, Neale E.; (R. C.) '21-'22; Council, Ida.

Rae, Charles Arthur; Ex-'14; St. Maries, Ida.; (Dentist.)

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Rettig, Edwin Claire; '19 B. S. (For.); Orofino, Idaho; (Clearwater Timber Protective Association.)

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Ruckweed, Fred John; '17 B. S. (For.); Plymouth, Wisconsin; (Gettysburg Pub. Schools, Gettysburg, S. D.)

Rudesill, Ralph M.; (R. C.) '20-'22; Bradford, Pa.

Russell, Raymond, E.; Ex-'22.

Rutledge, Walter T.; Ex-'16; Nyssa, Oregon.

Salvin, Otis William; Ex-'19; Carmen, Idaho.

Schofield, William Robert; '16 B. S. (For.); Chinook, Montana; (County Surveyor.)

Schroeder, Bert H.; Ex-'16; Cottonwood, Ida.

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Sharma, Parmeshri Das; '22, M. S. (For.); Rajpura Street, Chaunk Passian, Amritsar, (Punjab), India.

Shipman, Oroville, H.; (R. C.) '16-'17; Boise, Idaho.

Sievers, Lawrence; (R. C.) '20-'21; Milwaukee, Wisconsin.

Slavens, Erwin Howard; Ex-'20; Spokane, Washington.

Smith, Harley Roscoe; Ex-'14.

Staples, Howard W.; '20 B. S. (For.); Moscow, Idaho; (Yukon Gold Co., Murray, Ida.)

Stevens, Arthur W.; '15 B. S. (For.); 1830 Sharp Ave., Spokane, Washington.

Stillinger, Charles Roy; Special '19; (U. S. Bureau of Plant Industry, Moscow, Idaho.)

Stone, Capt. Lawrence Fielding; Ex-'15; Commanding Officer, Arcadia Balloon School, Arcadia, Cal.

Stoneman, J. Warren; Ex-'23; Rural, Hillyard, Wash.

Storms, Willard Sidney; Ex-'23; Rupert, Idaho; (Farmer.)

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Taylor, Norman E.; (Voc.) '20-'22; Oroville, Wash. (Ranger, U. S. F. S., Colville National Forest, Republic, Washington).

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Telford, Milton McKinley; Ex-'20; Coeur d' Alene, Idaho.

Thornton, James A.; Ex-'12; Coeur d'Alene, Idaho; (Logger.)

Throckmorton, Michael Reed; Ex-'24; Rupert, Idaho.

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Walker, Everett Foster; Ex-'23; Moscow, Ida.

White, Albert C.; (R. C.) '19-'20; Boise, Idaho, R. F. D. No. 1.

Williamson, Charles Leonard; Ex-'14; (N. Western Mgr. for Powers Regulation Co., Chicago, 318 Alaska Bldg., Seattle, Wash.)

Webster, Roy Russell; (R. C.) '15-'16; Post Falls, Idaho; (Rubedew Lumber Co.).

Welker, Leonard; (R. C.) '20-'21; New Holstein, Wisconsin.

Wetherbee, Lawrence E.; Ex-'24; Chicago, Ill.

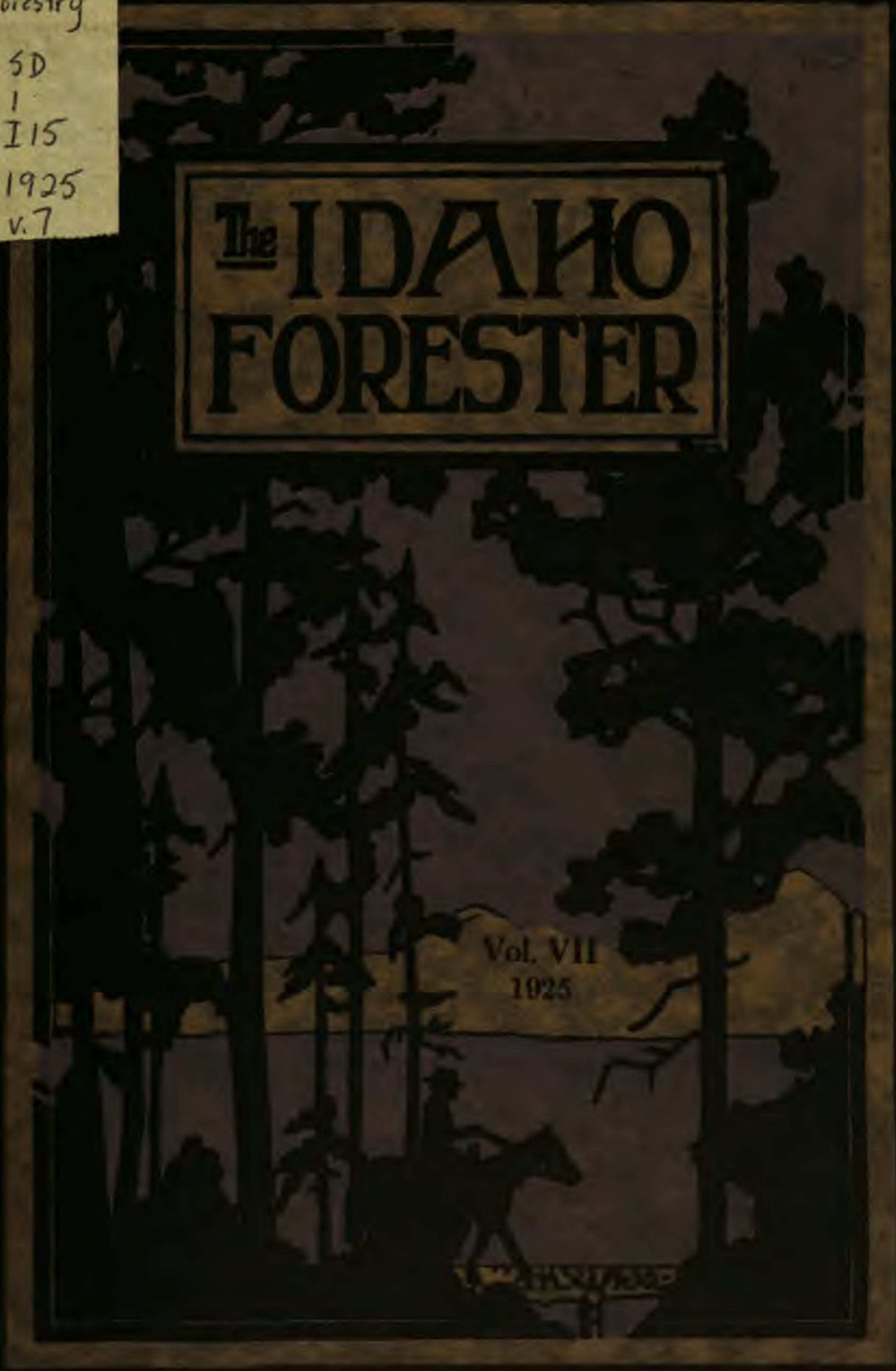
Williams, John; (R. C.) '16-'17.

Wiseman, Claude C.; Ex-'22; Middleton, Ida.

Wolfenden, William; Ex-'23; Gooding, Idaho.

Yates, Donald; '17 B. S. (For.); Potlatch, Idaho; (Land Department, Potlatch Lumber Co.).

Youngs, Homer Smith; '17 B. S. (For.); Deceased.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CONTENTS

In recognition of the conspicuous service he has rendered in promoting forestry in Idaho, more particularly in placing the state timber lands under forest management, this edition of the Idaho Forester is dedicated to the

HONORABLE I. H. NASH
State Land Commissioner

WHY A STATE CONSERVATION POLICY IN IDAHO

I. H. NASH
Land Commissioner, State of Idaho

The legislature of 1925 succeeded in passing a law, which is the inauguration of a conservation policy that can be made of vital benefit to the timber resources of the State. It was framed by a committee well versed in the subject of forestry; men with only the interest of the State as a whole in mind, not that of any particular section or individual: F. G. Miller, Dean of the School of Forestry of the University of Idaho, Chairman; W. D. Humiston, Potlatch Lumber Company; Guy B. Mains, U. S. Forest Service; C. K. McHarg, Jr., U. S. Forest Service; Ben E. Bush, State Timber Cruiser and Land Appraiser; H. C. Shellworth, Boise Payette Lumber Company; W. B. Kinne, small timber owner; W. G. Swendsen, Commissioner of Reclamation; Chas. A. Fisher, small logger; Hugh Sproat, Idaho Wool Growers Association; Carl E. Brown, small timber owner; L. E. Dillingham, Idaho Cattle and Horse Growers Association; R. E. Shepherd, irrigationist.

The law seeks to adopt a permanent forest policy, based on the theory that the State must cooperate with the other timber owners in timber protection, both because of its general responsibility to protect property and its interest as a large timber holder. The general administration of the law is vested in a State Cooperative Board of Forestry.

The State owns about 9.10 per cent of the timber within its boundaries; 29.6 per cent is in private ownership, and 61.3 per cent belongs to the Federal Government.

The State came into possession of its timber holdings through Land Grants made by the United States Government for the benefit of the State's institutions.

In addition to a grant of Sections 16 and 36 in each township, approximately 3,000,000 acres for public school purposes, the following acreage was granted for other institutions:

Insane Asylum	50,000	Acres
Public Buildings	32,000	''
Normal School	100,000	''
Charitable Institutions	150,000	''
Scientific School	100,000	''
Agricultural College	90,000	''
Penitentiary	50,000	''
University (State)	50,000	''
University (Territorial)	46,080	''
Total	668,080	Acres

The first selection of timber land was made in 1883, when 15,360 acres of University land were selected under the old Territorial Grant. No other selections were made until after Statehood. Commencing in 1891 selections were made each year until 1908, when all the grants, except 194.13 acres were reported filled. Cancellation of selections and errors made from time to time, have changed this acreage, the records today showing 2,049.57 acres yet to be selected. Out of these selections and School Sections 16 and 36, which contain timber, it is estimated that there are 700,000 acres of timbered land belonging to the State. These holdings are scattered throughout the timbered areas of the State, ranging from small forty-acre tracts up to large bodies containing thousands of acres. They vary in nature from scrubby growth or unmarketable species, to the thick stately stands of white pine, which are among the most valuable timbers of the State or Nation.

The State has in a compact body 177,545 acres, in the Priest River area in Bonner County—estimated to contain 1,100,000,000 feet of merchantable timber, 20% of which is white pine. In the Clearwater district are 132,277 acres, estimated at 4,000,000,000 feet of merchantable timber, 35% of which is white pine. The State has remaining in compact bodies about 55,000 acres of timbered lands south of the Salmon River, roughly estimated to contain about 509,598,000 feet.

One hundred forty-eight thousand acres of State lands are in the U.S. Forest Reserve, not all timbered, however, and a close estimate of the timber on this acreage made in 1922 gives 250,000,000 feet. The remaining timbered acreage is in smaller bodies, ranging from a half township down to forty-acre tracts, the principal parts of which are on Sections 16 and 36.

The estimates above given are not based on an actual cruise of the timber as the State has never had such a cruise made, but they are compiled from the best data available.

Honest opinions differ on the advisability of selling state timber. Some hold that it should

all be disposed of irrespective of demand or price in order that the State may have use of the interest and avoid the cost of fire protection. I, for one, hold a different opinion. Timber should be offered for sale no faster than there is a good reasonable demand for it, and should not be put on the market in the absence of such demand. It should not be sold to speculators to be held for indefinite periods before cutting. The State can well afford to hold such timber better than any other agency, because it does not have to pay taxes on the timber or interest on the money invested.

The wide difference in prices received today compared with earlier sales amply justifies this position. Our first timber sales were made only twenty-five years ago. The following table divides this twenty-five year period into four sub-periods, showing the acreage sold and the price received during each period:

ber lands should certainly be taken into consideration relative to their value."

According to this report, three previous administrations, one of Governor McConnell and two of Governor Steunenberg, had attempted to sell at much lower figures than were received under Governor Hunt's sales. These sales of Governor Hunt averaged $5.18 per acre, or thirty to fifty cents per M for the State's best holdings. They were of the choicest State timber, and if sold at average stumpage prices in effect today, would bring a much higher price than can be obtained for any of the remaining State timber.

Over 100,000 acres of these sales were in North Idaho, a large percentage being white pine worth double the price of yellow pine stumpage.

Thirty-three thousand acres were in South Idaho, and it is stated on good authority that the footage of this timber was roughly esti-

TIMBER SALES

1901 to 1924, inclusive

Time	Price	Acres	Average per acre	M. Feet	Average per M. Feet
*1901 to 1905	$ 699,045.96	134,766.11	$ 5.18		
1906 to 1910	526,260.47	38,523.11	13.64	303,113.00	$1.73
1911 to 1918	383,526.38	35,847.68	10.69	189,714.00	2.02
1919 to 1924	1,804,713.59	37,617.24	47.99	480,645.24	3.75

*No appraisement in this office on sales made in 1901-05.

These sales were made on mixed timber and the prices given are the average price received on all species sold. At that time the members of the State Board of Land Commissioners felt they were receiving good prices, and fearing the loss the State might sustain by fire, they recommended that the timber be sold as rapidly as possible. Frank Martin, Attorney General and Ex-officio Secretary of the Board, in his report for the years 1901-1902 to Governor Frank Hunt, said:

"Persistent efforts to sell the timber lands of the State to create a source of revenue for the various state institutions were made during the administration of Governor McConnell and the two later administrations of Governor Steunenberg, but they were practically unsuccessful. The demand for the lands has been aroused within the past two years. Their sale, at much higher figures than previously demanded, has opened the way for large manufacturing enterprises in this state and has created a source of revenue hitherto unattainable.

"These chances in the disposal of state tim-

mated by purchasing parties, and based on their footage estimate, the timber would run around 60 cents per M, but actual mill scale shows the lumber ran about double the amount of the estimate.

Timber has gradually advanced in price from that day to this, as a comparison of the prices received in the first sales with those received in recent years shows. For example since 1919, we have sold 37,617.59 acres of timber at $3.75 per M, or an average of $47.99 per acre. This is $42.81 more per acre or nine times as much as was received in the sales made from 1901 to 1905. In addition to the price paid for the timber in our sales, we made a requirement of all purchasers that they pile and burn the brush and slashings, which represents an additional cost to the purchaser of from 75 cents to $1.50 per M.

In 1919, the State's policy of timber conservation began on its own lands, and has been successfully carried on for the past six years. This policy preserves and protects all timber from wasteful burning. On white pine

(Continued on page 40)

POSSIBILITIES OF PULP AND PAPER INDUSTRY IN NORTH IDAHO

BY ELERS KOCH
Assistant District Forester, District One. U. S. Forest Service, Missoula, Montana

The pulp and paper industry in the United States has never been as migratory as the lumber industry. Where the sawmills cut out region after region, and moved on to the next virgin territory, the pulp mills, with their more stable plants and greater investments, have hung on to their original locations near the great concentration of population, cleaning up after the lumber industry, utilizing more and more closely, cutting second growth and less desirable species, and shipping pulp wood supplies from greater and greater distances.

A compilation by the Forest Service (D. A. Bull. No. 1241) indicates in 1922 a consumption by the United States of eight million tons of paper, requiring for its manufacture 9,150,000 cords of pulp wood. Of this amount only four and one-half million cords were produced in forests of the United States, the balance being imported in the form of wood, pulp, or paper.

It is predicted that by 1950 the paper consumption of the United States will be increased to thirteen and one-half million tons, requiring fifteen to sixteen million cords of wood. Considering this probable increase in consumption and the rapid depletion of pulp wood supplies in the Lake States and the east coast, it seems inevitable that the industry will have to move westward with the sawmills, particularly for the supply of the mechanical-sulphite species, spruce, fir and hemlock, which constitute seventy-eight per cent of the requirements. It seems probable that the requirements for soda and sulphite pulp can be met for a long time from present producing regions and the South.

Just how rapid this inevitable westward move will be it is difficult to say. A stage has now been reached where many of the pulp and paper mills of the Northeast either have no timber of their own, or very limited supplies. The Canadian supply apparently will not fill the demand for pulp wood of the future. For the past ten years pulp wood imports have remained at substantially the same level, and with the rapid growth in the Canadian pulp and paper industry it has become evident that the Canadian requirements will in time absorb the source of pulp wood now being drawn on by the United States.

The Canadian Parliament has given the Governor in Council authority to restrict pulp wood exports. If such action should be taken it might greatly expedite the western movement of the industry in the United States. At any rate it seems quite certain that production of paper in the northeastern quarter of the United States will not be able to increase. and will probably show a gradual decline as the supply of pulp wood becomes scarcer and higher priced. The increased output, to meet the demands of a growing population, must, therefore, come largely from the West. Just how far the Inland Empire region will participate in the new industry remains to be seen. Alaska and the west coast have the advantage of cheap water transportation to the big consuming regions on the Atlantic coast, and will probably reap the benefit of the first extensive migration of the industry. It does, however, seem reasonable to expect that when shortage of production in the East compels an extensive movement of the industry to the westward, the Inland Empire region will be able to compete both with the coast and the Lake States in the Middle West market, much as is now done in the lumber trade.

Under conditions as they are to-day, the outlook does not seem promising for immediate development of pulp and paper plants in the Inland Empire. It may be assumed that a plant in Montana or Idaho cannot now get outside the field of the Rocky Mountain States for its market, and in most of these States competition must be met both from the coast and the Lake States. A rough calculation based on population, per capita consumption, and a division of the field with the competing regions has indicated a possible news print consumption of 36,000 tons as a maximum which could be supplied by an Inland Empire plant under present competitive conditions. Since the existing paper mill at Spokane has an annual capacity of about 25,000 tons it does not appear as though there would be room for another plant until changing conditions make it possible to extend farther into competitive territory.

A good demand for pulp wood in the white pine region of Idaho would solve the worst utilization problems of the lumberman and forester. Logging in north Idaho, outside the yellow pine belt, is, of course, built around the white pine. It is a region of high cost logging which only a valuable species like white pine has been able to justify. On lands owned by lumber companies, millions of feet a year of white fir and hemlock are left standing after the white pine is logged, most of which subsequently is burned up by slash fires. On National Forest timber sales, where the cutting of white fir and hemlock is required for silvicultural reasons, a loss of $3 to $7 a thousand on these species must be figured in the appraisal and deducted from the value of the white pine. An established pulp wood market at a price which would allow the logger a reasonable profit would make a tremendous amount of timber available which cannot now be handled at all.

From the standpoint of an ample and permanent pulp wood supply North Idaho offers a very promising field to the pulp industry. The best estimate available for spruce, white fir and hemlock show four billion feet in private ownership, two billion State, and seven billion National Forest timber. These estimates are probably low, since the species of little value are seldom given full consideration in estimating.

To a prospective paper manufacturer seeking a permanent investment the supply of National Forest timber is of more significance than private timber, since under the present rate of cutting the privately owned timber in North Idaho will be pretty well exhausted within a generation, while the National Forests, being managed on a sustained yield basis, will furnish a continuous supply. Since the National Forests are generally higher and more mountainous country than lumber company holdings, the percentage of pulp species, spruce, white fir, and hemlock, is considerably greater.

Considering a permanent supply of timber as the most essential requirement, there are three sections of Northern Idaho which would each offer the possibility of an adequate supply of pulp wood. These are the Clearwater region, the Coeur d'Alene Lake region and the Sandpoint region.

In some respects the Clearwater region holds the most promise for an extensive pulp industry in the future. There is an enormous amount of the pulp species, white fir, hemlock and spruce, on the Clearwater drainage, both in the National Forests and in private ownership. There is a vast forest of private and State-owned timber in Clearwater County, as yet almost untouched. Clearwater County is estimated to have in the neighborhood of eight billion feet of private and State timber, of which more than two billion is composed of the pulp species. The greater part of this is white fir, which reaches its optimum development in the Clearwater region.

The estimates for the National Forests in this region are very rough, since much of it is complete wilderness country. All of the Clearwater and Selway Forests are drained by the Clearwater River, as well as the northern part of the Nezperce, which is on the South Fork drainage. The best figures available for this vast country give slightly over five billion feet of pulp species, of which 1,800 million is spruce, 3,200 million white fir, and a comparatively small amount of hemlock. Most of this would now be classed as inaccessible, and much of it lies in very rough country. However, all three of the main forks of the Clearwater may be considered drivable streams and the greater part of this timber will eventually be available. I believe it can be conservatively estimated that a sustained annual yield of fifty to seventy million feet of pulp species could be taken from the National Forests tributary to the Clearwater. The growth of white fir on the Clearwater drainage is phenomenal, and with proper management and good fire protection this yield could be greatly increased in future.

Considering only the matter of timber supply, there is no doubt the Clearwater drainage offers a wonderful opportunity for a paper mill.

The Coeur d'Alene Lake territory is, of course, a much more developed timber-producing region than the Clearwater. There is already a paper mill established at Spokane which draws its pulp wood supply from various points all over North Idaho, from Canada, and as far east as the Kootenai Forest in Montana. A mill situated in the Coeur d'Alene Lake region would have the advantage of a ready log market from the lumber companies who have an excess quantity of white fir and hemlock logs. The private timber resources have been pretty heavily cut into, and while it is always dangerous to make predictions of this sort, it is probable that twenty-five years will see the lumber company holdings of this region pretty well exhausted.

(Continued on page 40)

FIRE RESISTANCE OF NORTHERN ROCKY MOUNTAIN CONIFERS

BY HOWARD R. FLINT
District Forest Inspector, District One, U. S. Forest Service, Missoula, Montana

Apparently very little has been done to determine the relative resistance of tree species to fire chiefly, perhaps, because there appears to be small probability that foresters can make immediate practical use of the knowledge after it has been attained. However, the influence of fire on the forests of this region is so great that, as management becomes more and more intensive, we can ill afford to overlook any such vital characteristic as fire resistance of the species with which we deal. In a region where forest management must necessarily be on an extensive basis for many years to come, it may well be that where other things are about equal some preference can be shown the fire-resistant species in our silviculture.

Some intensive studies on this subject were conducted by Dr. J. V. Hoffman (1) in his first work on Douglas fir fire problems in the Pacific Coast region. These studies dealt chiefly with the relationship between age, barkthickness, and killing temperatures. A brief and simple resume' of Doctor Hoffman's findings is cited for those who are interested.

Among the inherent characteristics which influence the fire resistance of the various species the following are clearly apparent:

1. Thickness of bark.
2. Root habit.
3. Resin content of bark.
4. Branching habit.
5. Stand habit.
6. Relative inflammability of foliage.
7. Lichen growth.

Perhaps there are other factors not so plainly apparent but these are the principal ones and some of them seem to be of relatively slight importance. Obviously the tree that is fire resistant in several of the habits or characteristics listed above has a great advantage over the one which is in several ways subject to injury.

The studies previously mentioned, conducted by Dr. Hoffman, clearly indicate the importance of bark thickness in protecting trees from the effects of surface fires. Doubtless it is the most important of all the factors mentioned above. The experiments show that "Douglas fir with bark four inches thick resisted without injury to the growing tissues inside, a heat of 900 degrees Fahrenheit applied for four hours; and that slash fires heated the trunks from 800 degrees to 1400 degrees Fahrenheit for periods of 5 to 20 minutes without harm. Trees 35 years old with bark 1½inches thick were killed after 52 minutes and 15 year old trees with bark one-fourth inch thick were killed after 11 minutes in a heat of 900 degrees Fahrenheit. Young trees 8 years old with bark 0.15-inch thick were killed in 1 minute and 10 seconds."

A German investigator (2) reports that growing tissue (cambium) in trees is killed when heated to 54 degrees Centigrade (about 129 degrees Fahrenheit). Thus it appears that thickness of bark alone gives such trees as western larch, Douglas fir and western yellow pine a great advantage over many others.

Thickness of bark at the base of the tree varies greatly, and to a considerable degree directly with the age of the tree. The bark of a western yellow pine thickens very early in life, that of a Douglas fir is very thin in early youth and thickens moderately early. The bark of alpine fir thickens very slowly and never reaches great thickness. Thus most trees are poorly protected against fire in early youth but some develop protection early in life and others very late or to a very small degree only.

Many of our fires are surface fires or ground fires. This is particularly true of those that occur in other than the most dangerous times. In fires of this kind the tree with a deep or descending root system has a great advantage over one with a horizontal or surface root system. Here again, the western larch, western yellow pine and Douglas fir with their roots striking deeply into the mineral soil have a distinct advantage over trees like the western red cedar and western hemlock with their roots spreading horizontally just beneath a duff layer which frequently burns off with a considerable heat, leaving the shallow roots scorched and exposed in the top of a baked mineral soil. It is of course, true that the

1. West Coast Lumberman, Vol. 46, No. 551, page 60.

2. Heinrich Mayr, "Der Waldbau."

character or condition of the soil has considerable influence on the form of the root system of a given tree species. For example, Engelmann spruce in a poorly drained soil with an impervious clay substratum close to the surface will have an extremely shallow root system. A tree of the same species growing on a well drained slope but a few hundred feet distant will have a root system two to four times as deep, and accordingly will be much gree of resistance. Thus any scale of fire resistance must be applied with reservation.

The resin or pitch of coniferous trees is properly recognized as an inflammable material. Its presence in the outer bark of a tree greatly increases the susceptibility of the tree to damage by fire. The thick corky bark at the base of old western larch, white fir and Douglas fir trees bear but little resin and represent one extreme in this respect.

Figure 1.

Notice the thin bark with many resin vesicles. This is typical of **Abies lasocarpa.** The tree is about 100 years old, the bark only about one-fourth inch thick. Here is a bad combination; much litter, thin resinous bark, low-hanging limbs and dense stand.

Photo by Author

more resistant to ground fires. This seems to be true in a general way and in varying degrees of all species of conifers in this region. White fir (Abies grandis) growing on a moist bottom succumbs very readily to a creeping ground fire. White fir on the dry hillsides of the Clearwater River in Idaho is a fire-resistant tree more enduring than white pine and nearly equal to Douglas fir in de- At the other end of the scale is lodgepole pine and alpine fir, both with bark that even on the lowest trunk may long retain its resin content. The age of the bark is an important factor in resin content. The young bark of Douglas fir or white fir usually bears numerous "blisters" or vesicles filled with resin. These dry out and the resin disappears as the bark becomes old, thus on the same indi-

vidual the outer bark may be without resin at the base of the tree and very resinous on the new growth at the top. There also appears to be considerable individual variation in the resin content of the bark of trees of the same species and age.

There appears to be at least a casual relationship between what is known to foresters as "tolerance" or some of the characteristics that go to make up tolerance, and fire resistance. Generally speaking the intolerant trees of this region are highly fire resistant and the tolerant ones are of low resistance. The branching habit of intolerant species like western larch, western yellow pine and lodgepole pine is open and the trees usually prune fairly well, therefore, there is but little fuel on the lower part of the trunk to overheat it or to carry fire aloft. Engelmann spruce and alpine fir retain their lower branches for a much longer period and thus afford a ladder for fire to climb to the crown and a funeral pyre to roast the living tissue beneath the thin bark.

Closely related to branch habit is stand habit and consequently depth of litter or duff layer beneath the stand. Thus, stand habit has a more important bearing on the fire resistance of a species than is generally recognized. Its direct influence is on the spread and intensity of crown fires. All of the trees listed as of medium or low fire resistance with the exception of lodgepole pine and the possible exception of alpine fir are typically found in dense stands. They are subject in the highest degree to the conflagration danger, the totally destructive crown fire. Douglas fir and western larch are also occasionally found in dense stands but are much less typical of such stands than are the other species. A few high-headed old larches that tower above the dense stand, and a scalp-lock of Douglas firs on some dry, exposed ridge are often the sole survivors of a holocaust. This is largely due to a combination of fire-resistant features, but stand habit and branch habit play an important part.

It is a noteworthy fact that most, if not quite all, crown fires originate as surface fires or surface and ground fires. Indirectly, stand habit is a prime contributing cause to the heat and intensity of ground and surface fires. The most important part of the fuel of such fires in this region consists of litter and debris contributed by the stand above; fallen needles, dead twigs, naturally pruned lower branches, and the dead victims of keen competition for light and water. Clearly the denser the stand the greater the quantity of this sort of material cast down. The heavy duff layer furnishes fuel for a very hot fire to kill shallow-lying roots at once and to leave deeper roots exposed to severe and unaccustomed drying out. Strangely enough the effect does not end with the quantity of material which comes down. There is a further and perhaps an even greater effect in the slow rate of oxidation, decay, under such stands, due probably to comparative lack of aeration, light, and high temperature in such situations. Thus we observe that the duff may be three inches to six or more inches deep under a dense white pine stand, perhaps an inch under a western yellow pine stand and even less than that under a clean mature stand of lodgepole pine.

For the reason mentioned in the preceding paragraph the lodgepole pine with its roots entirely in mineral soil, with a minimum of fuel on the ground, and with an open stand habit not highly favorable to crown fires has several important advantages over western white pine with its thicker and possibly slightly less resinous bark. The placing of lodgepole pine above western white pine in the scale of resistance is, of course, debatable. Considering each tree in its typical stand the lodgepole appears to be the better survivor. Growing in mixture with white pine on a white pine site, as it not infrequently does, the lodgepole because of its thin bark appears rather less resistant than western white pine.

Inflammability of foliage is an important factor concerning which there has been a great deal of discussion and apparently but very little intensive investigation. A French writer Flammarion, (3) states that certain naturalists among the ancient Greeks regarded lightning as a kind of gum issuing from trees on dry days. It is a rather singular coincidence that some observers in this region refer to an exudation of highly inflammable gum from the leaves of conifers on dry days. Dr. James R. Weir of the Bureau of Plant Industry in an unpublished memorandum says, in part:

> "I find by microscopical examination that during unusually long continued droughts, not only does the entire epidermal covering of the leaves and young green twigs of pines, spruce and fir secrete more than the normal amount of a fatty wax-like coating in the form of rods or grains, but the inner surface of the guard cells exhibits a granular wax

3. "Thunder and Lightning": Flammarion. Translation from the French.

solution much above normal. An increased secretion of resin in the form of small drops is very noticeable on the leaves of western red cedar and juniper. Resinous secretions in the form of small papillae or rods are very noticeable at this (a dry) time on the young twigs of Douglas fir, spruce, fir and pine."

Further study of the question of inflammable resinous exudations from the leaves of coniferous trees might possibly yield interesting information concerning the inflammability of coniferous forests of various species at different times.

Some preliminary studies at Priest River Experiment Station indicate that the moisture content of living coniferous leaves is very high, probably 100% to more than 300% of the weight of the oven-dry material. This is to be expected because all living plant tissue is composed chiefly of water. Young leaves have been found to have a substantially higher moisture content than older ones, but it seems not to have been demonstrated that coniferous leaves contain substantially less moisture in midseason during a dry than during a moist period. Although it may not have been demonstrated experimentally it seems probable that leaves such as some of those on a fir tree, that have been on the tree for several years contain considerably less moisture than those of the larch which are never more than five months old. Possibly this is another factor in the high fire resistance of

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Figure 2.

This tree is a white fir, **Abies grandis,** of about the same age and size and only a few feet distant from the tree in Figure 1. Observe the hard bark more than a half inch thick. The resin vesicles have nearly disappeared. Except for bark thickness fire conditions are practically identical with those shown in Figure 1.

Photo by Author.

PROFESSIONAL ETHICS AS APPLIED TO FORESTERS

H. H. CHAPMAN

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Without some kind of an understanding of what it's all about, the forester in attempting to formulate his ideas on the ethics of his profession may end up with the belief which was said to have actuated the ancient Israelites at one stage of their national and religious development. "Every man did that which was right in his own eyes." Yet long before this period they had adopted, in the Ten Commandments the foundation of an ethical code which superseded the stark savagery of ancient civilization; and which Bolshevik Russia has in the 20th century rejected root and branch, thus reverting to pre-Mosaic standards.

The plain facts are that individual standards of right and wrong as illustrated in Doug Fairbanks' Thief of Bagdad's motto, "What he wanted he took," are neither a sufficient nor an efficient basis for safeguarding or advancing civilization.

The definition given to ethics by a recent writer(1) is "Practices are ethical if in the long run they make for the well being of the human species and for normal human relations. If there is friction and social loss it is a sure sign of unethical conditions." Looked at in this way, ethics is seen to be the expression of the common effort to secure the common welfare.

The common welfare, secured by common effort! Yes, but how about the individual? Individual initiative, striving for self advancement sometimes termed "enlightened self interest" is probably the most powerful of all the forces which make for the economic progress of society. Again we have the example of the Bolsheviks to prove the consequences that follow the crushing of this impulse and the substitution of state or governmental direction of every activity, resulting in paralysis and destruction.

Since Bolshevism's failure lies above all else in the rejection of every trace of ethical principles, both in personal conduct and in public affairs, this example may not only emphasize the real service performed by ethics, but point out the essential character of the principles themselves.

The common welfare is sought by Bolsheviks, in theory, by "common" effort—the very basis of their creed is "communism"—hence the miscarriage of their efforts must lie in failure to recognize basic forces in human nature which, if outraged and violated, bring any doctrinaire system to ruin.

This brings us squarely up to the problem, how is the common welfare best attained? Certainly it is easy to destroy it, just as a child can wreck the most intricate machine by a single well directed pass with a monkey wrench. But society is not an inanimate creation and is capable of fighting back, and suppressing its would be "saviors" as well as its deliberate enemies, just as the body subdues invading "red" germs, or the parent restrains the mischievous child.

Apparently and here I think lies the kernel of the matter, it is necessary in order to secure a progressive, orderly and beneficial state of society, that both of the two great forces which actuate men, individualism or freedom of initiative on the one hand, and collectivism, or the police power of the state, on the other, be respected, preserved, and harmonized. By the proper balance or tension of these forces, society and human nature are literally lifted up to higher levels. But the comprehension of a complex or tension—the idea of forces constantly in a beneficial struggle or opposition—is too much for the embryonic, caveman intellect, which in its immaturity demands one final and positive solution of all human ills, which, if they succeeded in getting it, whatever it is, would spell death, by terminating the healthy reactions necessary to continued life.

With this conception of the tension of individual and social forces as a starting point it is easy to see where Bolshevism has gone wrong and what we mean by ethics. Either of these forces, if it becomes paramount, becomes in that measure destructive, as certainly as does electricity when the balance between air and earth is disturbed. Rampant individualism means selfishness enthroned. Whatever form this takes, it is evil in its effect, not only on others but on the individual himself. There is not a form of lawlessness, crime, abnormality or to use the former phrase, "friction and social loss" but can be

1. Hermance, Edgar L.—Codes of Ethics.

traced to over developed egotism of individuals. The essence of selfishness is its tendency to gratification at the expense and to the harm of others—hence it tends in turn to restrict human liberty and substitute force for justice and equality. Then by an easy transition we find individuals who hold that their opinions are wiser than those of the remainder of mankind, super egotists like the old Spanish inquisitors, and like Robespierre and his modern Russian successors, employing tyrannical force to crowd these opinions down the throats of the world, prostituting the state to their despotic purposes and centering the organized forces of society in themselves to crush the individualism of common humanity, thus bringing the vicious circle to completion.

"The end justifies the means" is the shibboleth of the egotist and fanatic. Ethics has no place in his creed. We must formulate something better—How would this do: "The greatest amount of individual liberty commensurate with the common welfare." Here lies the possibility of preserving the balance, permitting each of the two great forces to contribute its share of positive or negative electricity, restraining the individual only when it is shown that such restraint is necessary to prevent social friction and loss, supplementing rather than supplanting private industry, proceeding on the basis of experience, by correction of past mistake, to evolve a better balance or tension, and to ease the strains and supply oil as well as "gas" to the machine.

Without any question, ethics, and ethical principles are the working rules which make this result possible and as such, are more important to society than vitamines or gland secretions in controlling the human body. They may be elusive and hard to formulate, but we can detect the results of their absence!

Ethics, as such, may exist as an acceptance of common ideas, voluntarily observed, as are many social customs of whose violations we speak in the phrase "It isn't done." In whatever form, whether written or not, whether enforced by a responsible body or left to the force of public opinion, a code of ethics is always a deliberate interference with individual freedom, aimed at any practice which tends to injure others besides the offender.

Professional ethics embodies those principles which should be observed by the members of a profession, in their professional contacts with each other and with the public, in order that the actions of a member of this profession may not bring the profession itself into disrepute with the public and hence harm every member in it as well as the offender.

The members of any profession have an absolute right not only to formulate a code of such ethical principles but to enforce it by any means which is most effective. Such a code and its enforcement are one of the chief services which a professional society can render to the profession which it represents.

It is obvious that this code should not seek to duplicate matters dealt with in common law. Naturally, if a man proves to be a thief or murderer this may also carry with it professional ostracism or expulsion from a society. What such a code should deal with are practices not covered by the criminal code, but which hurt the profession itself by diminishing its reputation, undermining the confidence of the public, and thus lessening its ability to give professional service.

Different branches of the forestry profession meet different problems. Foresters in the employ of the U. S. Forest Service for instance have a very well defined informal code, based on the standards reiterated by Pinchot and his successors and assistants and circulated by word of mouth and by departmental communications. They have lived up to this standard, based on public service, to such good effect that public confidence has completely replaced the original attitude of suspicion and distrust and this confidence is what makes the work of the Forest Service possible with so relatively inadequate a force as is at present maintained through a mistaken policy of economy or penury which prevails in the Department. Should this standard fall, public confidence would quickly disappear. Practically the same general code applies to state foresters, though the latter have occasional difficulties through not being automatically protected from the ravages of politics. In a few feeble efforts that have so far been made to formulate a code for foresters as a whole, it is evident that private forestry practice comes in for the greater portion of attention, indicating that this field is less clearly defined, and is more apt to cause trouble in reaching an understanding.

If professional ethics consists of principles intended to restrain individual selfishness from acts detrimental to the profession, we can elaborate the theme a little farther. What sort of acts is detrimental to a profession?

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AN EXPERIMENT IN FORESTRY

BY TOM JACKSON '19

Woods Superintendent, Fruit Growers Supply Company, Susanville, California.

The Fruit Growers Supply Company, a subsidiary organization of the California Fruit Growers Exchange, owns approximately 40,000 acres of timber within or adjacent to the Lassen National Forest. A few years ago this company added to its timber holdings by a purchase of timber from the U. S. Forest Service on the Lassen National Forest. It may be added that this sale was one of the largest the Forest Service has ever made.

By agreement the holdings of the Supply Company together with those of the Forest Service, covered by the sale were put under management with a view to giving the Company a perpetual supply of timber. The management plan provides for a seventy year cutting cycle. The Forest Service manages its holdings thru the man in charge of timber sales, and the Supply Company thru its forester, Mr. Herman Baumann, a graduate from the School of Forestry, University of Idaho, class of 1924.

Actual operations under the plan began in 1920. The first unit covers approximately 100,000 acres of government timber and 20,000 acres of Company timber. During the first few years of the operation the largest percentage of the cut will be on Company land but later the bulk of the logging will be done in government timber. The plan calls for a cut of from twenty-five to fifty million feet of timber per year from the Forest Service Sale.

The first unit runs about 70 per cent yellow pine, 25 per cent white fir, with a scattering of sugar pine, lodgepole pine and incense cedar. The whole area is a fair logging chance. It was originally estimated that about 50 per cent of the area could be logged with horses and high wheels and the remainder with donkeys. The fire hazard is greater in this unit than in the average pine stand due to the high percentage of white fir and white fir reproduction.

The Forest Service handles this sale in a manner similar to that of other government timber sales. The areas to be logged by horses, donkeys or other methods are specified. All timber to be felled is marked. This includes snags and diseased trees to be felled after logging. They supervise all phases of the logging, watch the height of stumps, manner of falling, and keep close check to see that no timber is left which should be logged. They watch that the lines in donkey logging are layed out so as best to protect young growth.

To date above 75 per cent of the logging has been done with horses and high wheels. This method is preferred over donkey logging by the Service as it injures less of the reproduction and leaves the ground in better shape. In fact the sales contract specifies that steam logging will be permitted only on areas where it is clearly impracticable to log with horses. However, caterpillar or tractor logging is coming into favor with the Service as they estimate that much of the reproduction which is swamped out to make roads for the horses would be left if the same area were logged with tractors. The local Forest Service officials advocate the replacement of all our horses and a large percentage of the donkeys with tractors.

It is obvious that the two big features of forest management as it is practiced in this country at present are: Regulation of the amount and quality of timber left in logging as a reserve crop and fire protection. Naturally it is these that the Service concentrates on. The sales contract calls for at least 70 per cent of the merchantable timber to be marked for cutting which gives an option of leaving 30 per cent. On the better stocked areas which cruise around twenty or twenty-five thousand feet to the acre this means a reserve of from six to eight thousand feet of merchantable timber. Cruises of cut-over Forest Service lands show this amount left. Care is taken by the officers who do the marking to see that in the mixed timber a large percentage of pine is left. They try to make the reserve over 50 per cent pine.

Brush disposal, an item of fire protection, is closely supervised by the Service, and the requirements on this sale are quite strict. The Service issues cards of instructions for brush piling, defining the size and shape of the piles, their location, distance from live trees and size of limbs allowed in the piles. The Service attempts to burn all piled brush which is sufficiently dry, each fall after the first snow. All snags and diseased trees are felled along with the brush piling as the limbs of these trees have to be piled for burning.

The labor cost for piling brush and falling snags, aside from supervision runs from 40 cents to 80 cents per M. ft. of logs in the mixed type of timber. In the yellow pine type it is much less.

The Forest Service frequently inspects and reports on our fire protection system but the burden of fire protection and suppression falls on the Company. The Company is governed both by Forest Service regulations and state laws in its fire protection. The main requirement of both are the clearing out and burning of all debris within one hundred feet of all donkey settings, equipping each donkey or engine with a force pump, two hundred feet of hose and a box of fire fighting tools, the maintaining of fire patrolmen, watchmen at the donkeys at night and noon hour, use of oil only in locomotives, and the maintaining of efficient spark arresters on all wood-burning engines.

The Forest Service maintains lookouts covering the entire sale area. Lookout points and our camps are all connected by telephone. The Company and Forest Service have a cooperative agreement whereby, for so much per acre, the Company gets lookout service and aid from any forestry officials who are present in fire suppression on Company lands. According to the sales contract the Company pays all expenses for suppressing fires within the sale area.

The Company forester is head of the fire protection and suppression organization and responsible for its equipment. He has from one to three patrolmen during the fire season. In addition to the equipment required by the state and Forest Service the Company keeps a box at each camp containing forty or fifty shovels and a proportionate number of axes and other tools and at headquarters, two pumps and one thousand feet of two inch hose, to be used in connection with water cars. With this equipment, water under pressure can be taken to a fire within one thousand feet of any railroad spurs.

The following poster outlines the Company's policy toward forestry:

It is the policy of this Company to log its own land in such a way as to leave and preserve the small trees and to leave the cut-over land in such a condition that a second growth will be obtained.

In order to obtain this result it will be necessary that:

Fallers: Will fall no trees under twenty inches in diameter, unless defective or marked for cutting.

Will avoid as far as possible the breaking of young trees when falling.

Will cut all stumps at a maximum height of eighteen inches above the ground.

Hooktenders: Will set their lines so as to avoid groups of young trees and pole timber.

Will place bushings under straps when slinging blocks on small trees that will be left.

Will log so as to prevent any unnecessary damage to the remaining stand.

Swampers: Will pile brush in open spaces away from standing timber that will be left after logging so that this brush can be burned without injury to the remaining stand.

For the first year or two fallers were instructed to leave a certain amount of merchantable timber. Lately the forester has been selecting and marking the trees to be left. On a recruise of over three thousand acres of cut-over land, logged mostly in 1921 and 1922, there were found to be an average of 834 feet per acre of merchantable timber left as a reserve. This included only sound, healthy trees over twelve inches in diameter. From yield tables and growth studies made on similar areas it is estimated that the Company could cut four thousand feet per acre from this land in seventy years. A recruise of 320 acres logged in 1924 showed an average of 1567 feet per acre of reserve timber.

The Company has done considerable experimenting in the past few years in an endeavor to work out a system whereby it could handle its lands from both a forestry and business standpoint. It has piled and burned brush on strips along railroad spurs and wagon roads and other advantageous points as fire protection precautions, and has maintained and up to date protective organization. However, since timber on the eastern slope of the Sierras is a slow growing crop, the Company is doubtful whether it can handle its timber lands as the Forest Service handles similar lands and show a satisfactory profit. From the data at hand, it would seem that the Company could practice forestry and realize from two and one-half per cent to three per cent on its investment.

PRODUCTS FROM IMMATURE WHITE PINE STANDS IN IDAHO

BY J. A. LARSEN
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In northern Idaho there are many immature stands of white pine and other species which can be made to yield both material and financial returns to the owner from thinnings. Many of these young forests are close to the market thus making the material readily salable as cordwood, railroad ties, fence posts or fence rails, mining stulls, props or lagging. In some instances the trees may be sold as match stock, bucket stock or box shooks, etc. The utilization of such young stands will also diminish the drain on higher grade material. The thinning of such young forests will be of great benefit to the trees which are left by speeding up the growth, for trees, like any other growing crop are apt to seed in thickly and come up altogether too dense so that most of them are retarded in growth and development.

The purpose in this brief article is to show what products can actually be cut from one such immature forest in northern Idaho. The data were obtained at Priest River Forest Experiment Station. In the vicinity of that station are eight permanent half-acre plots which are devoted to thinning experiments, four of these were begun in 1914 and four in 1919. On these plots thinnings were made in different degrees, that is, on some plots a heavy thinning was made with the object of giving the remaining trees plenty of room for later growth and development while on other plots only light or medium thinnings were made. The age of this stand when thinned was 60 years. Since it is altogether out of the question to present here all of the data obtained on these plots it is thought best to limit the figures to one or two representative or average plots. I am therefore giving the data for two plots of medium thinning; the first table showing the trees of different species and diameters removed and remaining on one of the 1914 plots and the second table the allocation of the material according to products on one of the 1919 plots. It should be stated that the largest trees are about 90 feet in height and 16 inches in diameter outside the bark. Most of the trees are from six to ten inches in diameter and from 60 to 80 feet in height.

The plot from which figures for table 1 were obtained is on a bench of average elevation of Priest River Valley at 2,300 feet. The stand contained relatively much larch, and the plot whose figures appear in table 2 lies in the narrow valley of Benton Creek,

Table I
Trees removed from ½ acre plot in a 60-year-old forest in northern Idaho
Medium Thinning

Species	W. White Pine			Western Larch			Douglas Fir			Miscellaneous			Totals	
Diam. Breast High, Inches	No. Trees Cut	Height in Feet	Vol. Cut cu. ft.	No. Trees Cut	Height in Feet	Vol. Cut cu. ft.	No. Trees Cut	Height in Feet	Vol. Cut cu. ft.	No. Trees Cut	Height in Feet	Vol. Cut cu. ft.	No. Trees Cut	Vol. Cut cu. ft.
1	17	16	3.91	35	22	5.3	3	17	0.5				55	9.71
2	54	24	8.64	71	33	32.6	10	21	4.0	5	23	2.0	140	47.24
3	39	31	34.70	64	41	55.7	7	26	6.8	2	29	3.4	114	100.40
4	12	36	22.70	26	44	37.7	1	30	14.2	2	35	3.1	41	77.70
5	5	44	13.75	14	55	38.5				3	43	13.8	22	66.05
6	1	60	6.23	10	64	49.0				2	55	9.9	13	65.13
7				3	75	20.7							3	20.70
8	1	70	8.84	7	75	18.2	1	35	4.6	1	80	12.8	10	44.44
9	1	80	15.25	1	75	11.7				3	85	48.6	5	75.55
10										1	85	19.1	1	19.10
Totals	130		1140.02	231		269.40	22		29.9	21		112.7	404	526.02

*Volume of entire peeled stem.
The total number of trees on this half acre was as follows; White pine 246; Western Larch 342; Douglas fir 23; miscellaneous hemlock, cedar, etc., 25.
Total trees per half acre 636.

a small tributary of Priest River. From the figures in table 1 it is seen that about one-half the number of trees were removed in the thinning. Naturally the mixed species such as larch and Douglas fir were cut heavier than the white pine. The actual removal showed 52 per cent by number of white pines, nearly 70 per cent of the larch, 96 per cent of Douglas fir and 95 per cent of miscellaneous species. The percentage in volume removed by the thinning is much lower than that

A sixty-year-old forest of western white pine and mixed species in Idaho, which will yield good returns from thinnings. Such thinning out of the inferior species and slower growing trees will result in increased growth of the trees left to grow for saw timber.

shown by the number of trees for the reason that as many as possible of the small trees were cut, reserving the larger ones.

The data given in table 2 show that products are obtainable from such young forests by thinning. (These figures were worked up from one of the 1919 plots. This shows more trees per acre in the original stand than the 1914 plot used in table 1 but fewer trees were removed than in the case of the 1914 medium thinning.)

From the data in table 2 it appears that one-half acre of sixty-year white pine timber will yield 987 cubic feet of material from a medium thinning. That is, a thinning which removes about one-half of the number of trees and which leaves about 400 trees per acre. The products obtainable will naturally vary according to the species for the more larch and Douglas fir the more railroad ties will be obtained, and the more lodgepole pine and yellow pine the more mining timber or cordwood can be cut. Not infrequently there are old snags from the previous forest which will help swell the cordwood measure. If we allow an average selling price of 20 cents per stull, 25 cents per tie, 5 cents per fence post, 2 cents per fence rail or lagging, $3.00 per cord and $5.00 per thousand board feet for bucket stock or match stock, we will have a gross return of $50.50 per one-half acre or $101.00 per acre.

Perhaps the best part of the transaction is the increase in growth and quality of the trees which have been given more growing space after the thinning. This increase in growth as a result of the thinning will be discussed at some later date.

The thinnings referred to in this article are conservative, that is, they may be considered comparatively light, not removing as many

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Table 2
Products which can be harvested from one-half acre of 60-year-old white pine forest in northern Idaho

Species	No. Trees Total	No. Trees Cut	Total Vol. Cut cu. ft.	No. Stulls Cut 14 to 16 feet	No. ties cut 8'x7"x7"	No. Fence Posts cut 7'x5"	No. Mining Props cut 16'x5"+	No fence rails 16'x3"+	Bucket Stock bd. ft.	Cordwood @ 58 cu. ft.
White pine	220	86	234.47						300	3.21[4]
W. larch	27	16	148.80		13					1.76
Douglas fir	112	98	301.20	8		172				2.22
Misc.	120	79	303.13	16[3]		19[2]	17[1]	14		2.55
Total	479	279	987.60	24	13	191	17	14	300	9.74

1— Lodgepole pine.
2—Yellow pine.
3—Lodgepole and yellow pine.
4—The number of cords includes timber to tips.

SOME METHODS USED IN GRAZING STUDIES

C. L. FORSLING, Director, Great Basin Range Experiment Station

Systematic grazing studies on range lands have been under way since 1907. A number of problems had been given considerable study by several investigators prior to that time, but it was not until grazing studies were started on the National Forests in the West in 1907 that organized activities in this field had their beginning. Since that time projects have been undertaken by the U. S. Department of Agriculture, a number of the western State Agricultural Experiment Stations, and by private organizations. The most extensive work since 1913 has been carried on at the Great Basin Range Experiment Station in central Utah. During the eighteen years that have intervened there has been consistent progress in the development of methods for conducting grazing studies.

The Object of Grazing Studies

The purposes of grazing studies are twofold. The primary object in their undertaking was to develop methods of grazing use and handling livestock to obtain the highest and best use of the forage crop consistent with the perpetuation of the forage and related resources. In the early days of the range livestock industry, when there was an abundance of range and cost of production was comparatively low, but little attention was given to how the forage resource was used or conserved. This led to a decline in productivity on large areas. As the industry spread to all the available grazing lands and cost of production began to climb, there arose a need for more efficient utilization of range forage. The pioneer range investigator, therefore, found a comparatively new and broad field of work. Although good progress has been made during the brief period that range research has been under way, the field is still comparatively new. There are many recognized problems which have not been given much attention because of the limited time and money which is being devoted to range research. As conditions surrounding the livestock industry change, better methods of range management will have to be worked out to meet them. Development of improved methods of range use, therefore, remains one of the main objects of grazing studies.

Results already accomplished in range research have shown that regulation of the number of animals grazed, correct grazing season, better methods of handling livestock on the range and provision for natural revegetation of the native forage plants are essential to maximum forage production and its best use. The successful livestock producer, therefore, must adjust the period of grazing and numbers and methods of handling his livestock so that no injury to the range will result and overgrazed areas may improve. The proper adjustments to apply in the present use frequently are not obvious to inspection. Changes in the forage cover are often so slow that they are imperceptible to the eye; yet if allowed to continue over a period of years they may result in a material decline in yield. However, such changes are revealed by careful study. Consequently, a second purpose of grazing studies is to determine the effect of current use upon the range, in order that adjustments in its management may be made upon a sound basis.

Grazing Management a Problem of Ecology

Grazing management is essentially a problem of plant ecology. Plant ecology treats of the response of a plant, or group of plants, to the factors of the habitat, such as soil, moisture, temperature, animal life, etc. Grazing animals are a factor of the habitat, so to speak, and the object of grazing management is to control this factor in a manner that will not interfere with the renewal of the forage crop year after year. All of the factors of the habitat, other than the grazing animals themselves, play an important part in the final outcome in forage production. Although the grazing student is primarily concerned with proper control of grazing animals, it is necessary for him to know the effects of the other factors in relation to grazing before the effect of grazing alone may be understood.

Since grazing management is largely an ecological problem, ecological methods are used widely in grazing studies. Some revision of the methods ordinarily used by plant ecologists have been found necessary in order to adapt them to the needs of grazing studies and a few special methods have been developed. On the whole, however, there has been no great deviation from ordinary research methods in ecology.

Changes in Plant Cover

Changes are continually taking place in the composition and density of the plant cover in response to changes in any of the various factors which influence or control plant growth. A number of publications, including most text books on ecology, deal with this subject. One of the more recent and most exhaustive treatises (1) is listed at the close of this article. These changes are occurring regardless of whether there is use of the vegetation by man for grazing livestock or for other purposes although grazing, and more particularly improper grazing, is usually the dominant factor on pasture lands. An understanding of these changes in plant cover is a prerequisite to proper range management.

The normal trend of the change in plant cover is positive, or from a lower to a higher plant type, the final form of which, if there is a final form, is called the **climax.** This following of one group of plants by another group of a higher scale is called **plant succession.**

The plants themselves are the most influential cause of plant succession. When a lower form of vegetation occupies an area for a period of time it changes a number of the growing conditions directly or indirectly such as structure, fertility, moisture-holding capacity and temperature of the soil, and atmospheric and light conditions near the surface of the soil. These changes make possible the support of a higher type of vegetation and new species of the higher type slowly invade and crowd out the plants of the lower type. Each successive wave of vegetation makes way for another higher form until a fairly stable type is eventually reached.

Factors other than the successive plant invasions may cause changes in the plant cover. These include biotic factors, such as man and animals, deposition or erosion of the soil, climatic factors to some extent and lightning and man-caused fires. These factors may work to aid or hinder normal plant succession. Erosion, for example, may improve the soil by weathering down the rocks and coarser materials. On the other hand, running water or wind may remove the best part of the soil. Grazing animals may operate favorably through addition of humus and in the dissemination and planting of the seed, or in the opposite direction, to destroy the occurring vegetation. Any change in climate will improve or impoverish the growing conditions, depending upon the character of the change. All of the factors work together and the final outcome is the result of the complex of these processes. Some factors may operate to offset to a greater or less degree the favorable result of others so that the present plant cover is the result of the dominant factor or factors operating in one direction.

It follows, therefore, that the order of things in plant succession may not always be progressive or in a positive direction. Certain factors, such as grazing animals, fire, and removal of soil by erosion and adverse climatic conditions may slow up or prevent positive succession, may go so far as to cause a type to revert to a lower form of vegetation, or, if severe enough and extended over a sufficient period, may result in complete denudation. The turning back of succession is often called **retrogression** by ecologists. Positive succession, or the process of building up toward the climax type, is resumed as soon as the disturbing factors causing retrogression are overcome.

Grazing management may be said to be concerned with the control of grazing animals in order that they will not cause retrogression, but wherever possible an increase in the palatable vegetation. The phases of vegetation which occur in retrogression, due to uncontrolled grazing, processes in succession which follow adjustment of grazing for certain plant types, and certain other disturbing factors have been described by various authors, including Sampson (2), Clements (3), Jardine and Anderson (4), Jardine and Forsling (5), and Shantz (6).

The chief factor other than grazing with which the grazing student is concerned is climate. Fire, which is usually accidental, and certain man-caused factors, such as logging and cultivation, may enter in at times, but they are largely local in nature. Climate in the aggregate does not change over a period of years, although there may be variation over several centuries. (Huntington (7) and others.) There may be fluctuations one season with another, however, and these are the ones with which the grazing student is concerned.

Even the most casual observer has noted variation in annual rainfall, for example. A period of one to several years with rainfall below the average may be followed by periods with moisture conditions that are average or above. These fluctuations may cause the density of the vegetation to vary as much as 50 per cent or more (6), and cause a temporary

change in the composition of the vegetation. Grazing must be regulated in accordance with the decline in amount of forage species due to adverse climatic conditions. Otherwise, there may be deterioration of the range due to the over-grazing that would result on account of subnormal forage productions. Variations in other climatic factors may affect growth in a similar manner.

Determining Changes in Plant Cover

Since the change in plant cover is of such great significance in the proper control of grazing, the grazier and the investigator are immediately concerned in what these changes are and how they may be determined. Determining them constitutes a major portion of grazing studies.

The Permanent Sample Plot

The permanent sample plot is the basis for studying change in vegetation. Comparison of records of the amount and character of the vegetation on such plots, obtained at suitable intervals, will show whether the plant cover is improving, holding its own or declining in amount and quality. It is impractical to determine with any degree of precision the change that may be taking place over the whole of a unit of range because of the immense task involved. Estimates of the density and composition of the vegetation on the range by plant types by experienced investigators are valuable to show the general changes over a period of years, but are inadequate to show the detailed variations with the accuracy required, or to show changes over short periods. Changes, except where there is gross misuse, are usually so slow as to be inappreciable to the eye. The best plan, therefore, is to select one or more permanent plots upon which to make detailed studies. If representative, the results from such plots may be applied elsewhere wherever conditions are similar to those on the plots.

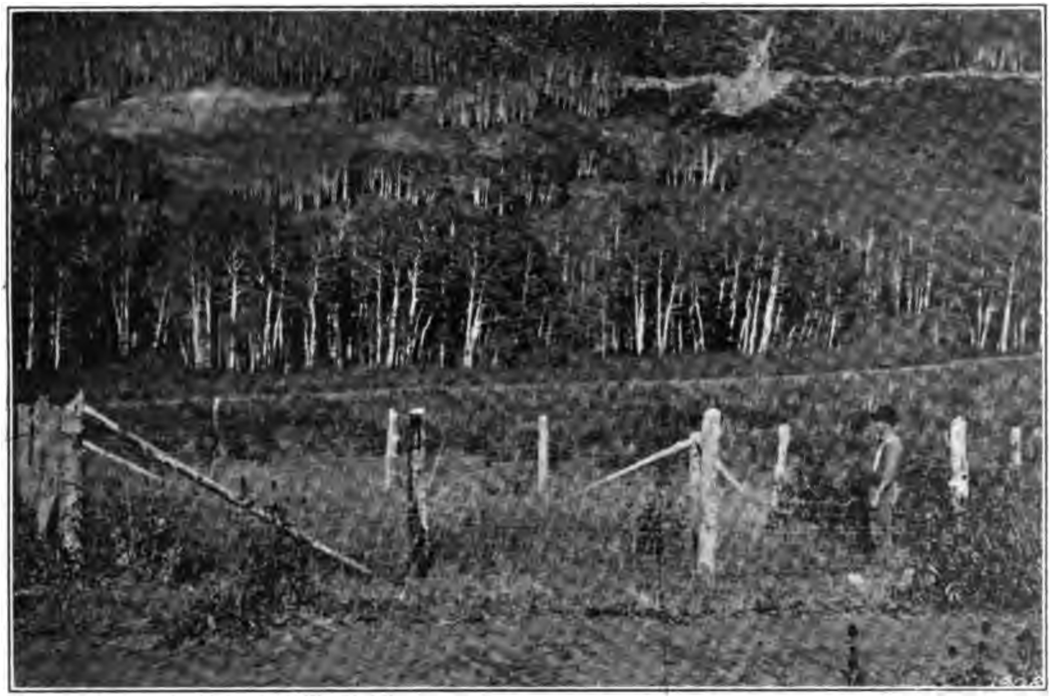


Fig. 1. A sample plot fenced to exclude livestock. Plots of this nature are of value for checking the results on open plats, and for showing the potential productivity of the range.

Sample plots must be permanent if they are to serve their best purpose. The same area must be compared time after time over a period of years if the actual sequences in vegetation are to be shown. Temporary plots are of value for studies that may be complete in a short time, but where the object is to determine the trend of both the quantitative and qualitative changes in plant cover the same plots must be available throughout the per-

iod of an experiment or the time of use of an area for grazing purposes.

Kinds of Sample Plots

There are three general kinds of sample plots commonly used in grazing studies. They are (1) the open plot, (2) the protected plot, (3) the hurdle, or partially protected plot. Ordinarily two or more of these are used in combination.

The Open Sample Plot: The **open** sample plots are those located on the range subject to grazing. The records for such plots will show quantitative and qualitative changes in plant cover on account of grazing, **together with the other factors of the site.** They are incomplete in themselves, therefore, to show the effects of grazing alone or the potential productivity of the range. They will show, however, whether the range is improving or deteriorating, which information is often sufficient for deciding whether present use is harmful or satisfactory. Protected sample plots for use as a check against the open plots are necessary for arriving at more conclusive results.

The Protected Sample Plot: Protected sample plots are those located within enclosures or areas fenced to exclude livestock (Fig. 1). They are subject to all the other conditions of the site except grazing. Their history, therefore, will show the changes in vegetation on account of the factors other than grazing. By correlating the results obtained on an open plot with those from a nearby protected plot, it is possible to arrive at the effect of grazing on the open plot to a fairly accurate degree. Moreover, it is frequently quite difficult to ascertain what a given site is capable of producing when no records of past conditions are available. Protected plots which have been established for a number of years so that the vegetation will have had an opportunity to grow undisturbed by livestock will serve as a check to show the vegetation that a range is capable of supporting when undisturbed. Protected plots established contemporaneously with open plots will serve as a check on whether or not the open range is improving as rapidly as might be expected.

The size and construction of enclosures depends upon the purpose of the sample plot and the building material available. Cost usually governs the maximum size, and the area required to obtain representative conditions determines the minimum size. The enclosure should be large enough so that light conditions, air movement and precipitation are not changed on the sample plot. An area 33 feet square, where pole or wire fence is used, is about the smallest plot that can be used without interfering with growing conditions. Larger protected areas are advisable when facilities permit their construction. Where timber is available, pole fences can usually be constructed at the smallest cost. On the other hand, where transportation is a factor, barbed wire, woven wire fences, or a combination of the two is ordinarily the cheapest and the best material. Fences should be well built, be adequate to exclude all classes of stock which may use the range, and be kept in good repair. In localities where snow attains a depth of three feet or more, wire fences that can be dropped to the ground and replaced again in the spring or pole fences should be used.

Hurdle Enclosures: The **hurdle** enclosed sample plot is one enclosed with a removable fence. They are used for studying the effect of various modifications in the time and degree of grazing. The investigator frequently desires to try out some new method of grazing or to determine the application of some system, the principles of which have already been worked out. The usual empirical method of this purpose is to graze a number of areas in accordance with the system that is being tested. The cost incident to handling livestock on a number of such areas is often greater than the available time or money will permit. Such systems of grazing may be studied on a range used continually under one system, with the hurdle enclosure. The fence is placed about the sample plot or removed in accordance with period of use or degree of grazing that the study plan calls for.

The hurdle plot method is especially adapted for determining the time when grazing may begin in the spring without injury to the vegetation from too early use, and the application of deferred and rotation grazing. In studying the opening of the grazing season, for example, several hurdle sample plots and one or more open plots are established on the range. These closed plots are opened to grazing one by one at intervals of several days to a week beginning shortly after the opening of the grazing season, and are then grazed the remainder of the season. This is repeated with the same plots for a number of years and the data will, when correlated, give the basic information for determining the proper date of beginning the grazing season. In a

(Continued on page 45)

YOUNG STANDS OF WESTERN WHITE PINE PROGRESS REPORT

C. W. WATSON
Assistant Professor of Silviculture, School of Forestry, University of Idaho

As a result of old burns in north Idaho there have sprung up many stands of white pine reproduction. These vary in age and density. Large areas of this nature belong to lumber companies which had to buy them along with desirable mature timber. It is a question before these companies whether this young forest justifies protection and how long a time. The Edward Rutledge Timber company is especially interested in this problem, and it was due to their request that this project was initiated.

To answer this question it was deemed that a prediction of yields would be necessary. The first real effort to do this was made by the author and an assistant, Mr. Wheaton, in the region of Clarkia, Idaho, during the summer of 1924. A period of five weeks sufficed to cover 55 forties by a strip survey method. The survey was made by forties.

After some experimenting it was found that a method offering reasonable accuracy and speed consisted of running a strip thru the middle of each forty. The strip was one-half chain wide and trees of all species were tallied down to 2 inches D.B.H. In running the strips a standard Forest Service compass was used with a two chain trailer tape for distance.

The survey in each forty really consisted of five sample plots each two chains long and one-half a chain wide, since the trees were tallied only on alternate strentchings of the tape. This was done to speed up the work and, as the "plots" were uniformly spaced, it was felt that a good average of the forty would be obtained. By this method a mile a day, or four forties, could be run.

Besides tallying the reproduction, sample heights of average dominants were taken and borings made to determine the age of the stand. These measurements were made on four or five trees at the end of each five chains of the strip.

In the office, the computation was based on trees 2 inches and up, 7 inches and up, 10 inches and up,—three classes . Table 1 shows a sample forty fully worked out.

Next, each forty was compared with Forest Service normal yield tables for western white pine—those worked out by Larsen and Haig of District One. These yield tables were classified by sites I, II, and III. On the basis of height of dominants for a certain age, each forty was regulated to one of the three sites and the comparison of basal areas gave a reduction factor from the normal yield table to the usually understocked forty. Yields were predicted by ten year periods from 1924 to

Table I
Growth Studies in White Pine Reproduction—Clarkia, Idaho, 1924.

Species	Species per cent	Total number of trees 2 inches and up	Average D. B. H. 2 inches and up	Basal area	Trees 7 inches and up	Average D. B. H. 7 inches and up	B. F. volume 7 inches and up	Per cent volume 7 inches and up	No. trees 10 inches and up	Average D. B. H. 10 inches and up	Volume B. F. 10 inches and up	Per cent volume 10 inches and up
White pine	44.0	182	6.2	45.37	74	9.1	2,860	48.8	18	13.1	1,410	40.4
Larch	4.0	12	7.0	4.08	6	10.0	330	5.5	2	14.0	240	7.7
Douglas fir	16.5	66	3.4	13.94	22	8.9	815	13.4	8	10.7	400	12.8
Lodgepole pine	16.0	64	6.7	17.93	28	10.8	1,560	25.9	16	12.7	1,220	39.1
Hemlock												
White Fir	16.0	64	4.8	9.62	12	8.2	390	6.4				
Red cedar	2.0	8	2.2	.23								
Engelmann spruce	0.5	2	2.0	.04								
Yellow pine	1.0	4	3.0	.22								
Totals and Averages	100.0	402	5.5	91.43	142	9.4	5,955	100	44	12.6	3,270	100

Acre Basis.
Township 42 N. 2 E.
Section 5.

Forty No. 5.
Aver. Age 32.
Dom. Hgt. 45.

Table II—Summary of Data Sheets for 48 Forties

Age	Hgt. Av. Dominant	Total No. Trees 2 in. D. B. H. and over	Av. D. B. H. Trees 2 in. and up	Basil Area Sq. In.	No. Trees 7 in. D. B. H. and over	Av. D. B. H. Trees 7 in. and up	B. F. Vol. Trees 7 in. and up	No. Trees 10 in. D. B. H. and over	Avr. D. B. H. Trees 10 ni. and up	B. F. Vol. of Trees 10 in. and up
33	43	623	4.6	86.6	109	8.5	4,017	26	11.0	1,724
Corresponding Figures from Site III Yield Tables										
33	44	1200+		98.0						2,000

Figures Averaged on Acre Basis for 48 Forties.

1984 or 1994—far enough so that the stand would be 90 to 100 years old.

Table II shows conditions averaged for the whole area covered with the exception of cne poor area taken near the summit of the Clearwater-St. Joe divide.

It is evident from Table II that the average of the data would not allow better than a site III yield table for comparison. This was of course true of the majority of the areas, but nine of the forties were placed in site II. Table II shows a basal area comparison of 86.6 divided by 98.0 which equals 88.5 per cent. This percentage is a little too high, since some site II yield tables were used and these have larger basal areas than a site III table. An actual average of yield table basal areas used is 103.8 square inches, so 86.8 divided by 103.8 equals 83.5 per cent of normal stocking.

In almost every case the number of trees was very low as compared with yield tables. On the other hand the volumes were very high and sometimes equaled or exceeded those of the yield table. Altho the number of trees was low, the growth, particularly in diameter, was correspondingly high. Where the white pine predominated the trees were well spaced with more growing space than was needed. They often were quite limby even to the base.

Table III gives the summary of the predicted yields:

Table III—Summary of Predicted Yields

Sec. No.	Present Age	1924 Dom. Hgt.	1924 Volume W. P.	1924 Volume Total	1934 Dom. Hgt.	1934 Volume W. P.	1934 Volume Total	1944 Dom. Hgt.	1944 Volume W. P.	1944 Volume Total	1954 Dom. Hgt.	1954 Volume W. P.	1954 Volume Total	1964 Dom. Hgt.	1964 Volume W. P.	1964 Volume Total	1974 Dom. Hgt.	1974 Volume W. P.	1974 Volume Total	1984 Dom. Hgt.	1984 Volume W. P.	1984 Volume Total
1	33	40	0.3	1.2	53	1.0	3.1	64	1.9	5.4	73	2.8	8.4	81	4.1	13.1	89	5.9	19.2	97	7.0	21.3
25	39	51	0.7	1.8	62	1.7	4.3	72	2.9	7.2	82	4.3	9.7	90	5.8	14.6	97	7.1	18.4	105	8.1	21.4
31	31	39	0.2	0.8	52	0.6	3.6	62	1.1	4.2	72	1.6	6.8	80	2.6	10.4	86	3.5	14.2	95	4.1	16.9
29	33	43	0.4	2.1	58	0.8	3.8	69	1.2	6.9	79	2.2	12.2	87	3.3	16.1	95	4.2	20.7	102	5.1	25.2
19	32	44	0.6	1.3	55	1.6	3.8	65	2.7	6.5	74	4.3	10.4	82	6.7	15.9	90	9.0	21.8	97	10.6	25.7
5	33	44	1.7	3.0	63	2.9	5.3	77	6.3	11.4	92	9.5	17.6	104	10.2	22.7	113	16.8	31.8	120	20.6	29.0
Avr.	33	43	0.6	1.7	57	1.4	4.0	68	2.7	6.9	79	8.1	10.9	87	5.4	15.5	95	7.7	21.0	103	9.3	24.9

Summary of Predicted Yields

The highest yields per forty were found in Section 5 where the volumes predicted for 1984 run as high as 63,100 board feet of all species and 43,000 board feet of white pine alone.

Thus far the work has shown that most of the young stands are thrifty and well stocked. There is an average of 34 per cent white pine in them as a whole. It is perhaps surprising that the country about Clarkia falls in site III. The allocation to sites is based on the heights of average dominants in the stand, and if the measurements of these heights were very conservative, at least more so than the yield table, it might throw a site II into site III class. This detail of the work offers chances for variation. The author feels that the satisfactory way for overcoming any error here would be to measure these dominant heights in just the way that was used in assembling the data for the yield table selected as a basis for predictions.

It is planned to extend these studies for one more year, and an effort will be made to study the field methods of a party which District one plans to have work up yield table data for white pine. In applying general yield tables

to local conditions, considerable adjustment is necessary and an intimate knowledge of the methods used in making up the table certainly will not come amiss. During the coming summer, a party of three men will be in the field, and probably at least 100 forty acre units will be examined. This added to the 55 already completed should furnish a good basis for general conclusions.

BEN E. BUSH
First State Forester of Idaho

At the organization meeting of the Idaho co-operative board of forestry held at Boise, March 16, 1925, Mr. Ben E. Bush was nominated by the Board as Idaho's first state forester, and the nomination was promptly confirmed by the state board of land commissioners.

Mr. Bush is an alumnus of the University of Idaho, taking his degree in mining engineering, but almost continuously since his graduation in 1903 he has been associated with some phase of the timber business. In more recent years he has been connected with the state land department as land agent in special charge of timber sales, and in this capacity has acquired an unusual knowledge not only of the state's own timber holdings, but of forestry conditions and forestry needs of the state in general.

It was largely thru his influence and that of the state land commissioner, Hon. I. H. Nash, that the state several years ago began practicing forestry on its timber lands, and all state timber sales are now made under provisions calculated to insure continuous timber crops.

Mr. Bush is a practical forester and timberman, has the confidence of foresters and timber operators and his appointment has met with state wide approval.

EMERA W. RENSHAW
Deputy State Forester

Emera W. Renshaw, recently appointed deputy state forester by the state board of land commissioners, is a member of the class of 1925, School of Forestry, University of Idaho. His appointment was made effective May 1.

In addition to his technical training in forestry, Mr. Renshaw has had valuable practical experience in the woods, having been connected with the Forest Service for some time on timber reconnaissance and fire protection.

Mr. Renshaw is a western man, Washington being his native state, tho in later years he has lived in Idaho, his home being at Kamiah. He therefore, knows western conditions, in partciular the forestry needs of Idaho, and is well qualified for the important post to which he has been appointed.

SECOND ANNUAL BARBECUE A HUGE SUCCESS

H. I. NETTLETON
Instructor in Forestry

Practically every member of the associated foresters, faculty included, is suffering either from rheumatism sore or dislocated shoulders, black eyes, gunshock, blistered feet or indigestion, as a result of the second annual barbecue, held Saturday afternoon at Rowland's Park.

Transported in twelve cars, ranging in size from "duet-lizzies" to a "twelve-homme" truck the fernhoppers deserted their spring-fever infected class rooms for the pine scented coliseum of Mother Nature and for six hectic hours strived to outdo each other in tests of strength, skill, daring and gastronomic capacity. Mental tests were discarded for the day.

First place in the opening field event was annexed by the juniors when Phelps swung a horse-shoe lined glove against "Utah" Allgood's right eye and gave the sophomores' white hope a glimpse of all the stars in the universe.

Cranston, also a junior, gave his classmates the next two events by winning the 50 and 100 yard dashes, aided by the inability of his competitors to keep from falling over each other's feet.

Baird and Gregory lead Sophomores

Baird and Gregory, the Damon and Pythias of the sophomore woodsmen, led the second year men to victory in the rifle shoot, although, despite Professor Watson's strict chaperonage, it is rumored that the boys killed one cow and a "crested wicky-bird," which accidentally flew within range of the gold dust twins. The freshmen, nearest competitors in this match, claim that "Spike" Gregory shoved his wooden leg thru the bull's eye of his target before it was erected and then claimed that he had bunched his hits within the black circle.

The next event, a tug-of-war across White Mule Creek, between ten man teams of the underclassmen, resulted in the drowning of the entire sophomore team, which went down to a watery grave without a murmur—due principally to the fact that the sophomores inhaled too much mud to do much talking.

Not satisfied with this wholesale massacre, the rooks next proceeded to take the third year men across the Rubicon to their decisive defeat. When the battle smoke had lifted, the second casualty victim of the day, Ted Seely, was found stretched on the ground with a dislocated shoulder—which proved the pulling power of the first year men.

Senior team winning the log sawing contest

Space Swings Mean Axe

Space, senior, gave his classmates first honors in the log chopping contest by driving his axe thru a twelve inch yellow pine log in one minute and forty-five seconds, although his sophomore brother was a close second in this event.

Chagrined by their muddy defeat in the tug-of-war, the juniors came back in the log sawing contest when White and Callender smoked

the six foot crosscut thru a tough old fir so fast that the flying sawdust burst into flames as it left the log, requiring the installation of a home made sprinkling system to avoid a general conflagration.

The sophs had their inning in the wrestling meet when Burroughs threw Downer over McLaughlin's new Essex Coach and then won from Bolles thru forfeiture. In the meanwhile some of the lumberjacks had constructed a temporary dam in White Mule Creek, then coaxed a log into its rapidly rising waters and proceeded to stage an informal log rolling contest. Due to lack of experienced entries, this event degenerated into a mud hen diving contest in which the log invariably remained on top.

Thus ended the field meet in which the class standing was as follows: Juniors first, with 28 points; sophomores second, with 26 points; freshmen third with 19 points and seniors fourth with 11 points.

At 6:15 p. m. Chef Bolles' stentorian invitation to "come and get it" caused a general rush for chow tools and within sixty minutes about forty dollars worth of roast pork, beef, hotdogs, baked potatoes, and beans, topped off with ice cream, had all disappeared and the second annual barbecue was history.

THE FORESTERS' EXHIBIT

Clarence C. Olsen, '26.

The Associated Foresters' Exhibit, sponsored and staged by the students of the School of Forestry, as an intregal part of Engineers' Day, was visited by many hundreds of people. In conjunction with the Engineers, Architects, Physicists and Miners, a united exhibit was held at various places of the campus on May 1, 1925. To Harold Z. White and Warren H. Bolles goes the credit for the successful carrying out of the Foresters' share in the exhibit. Thru the assistance rendered by the faculty, and the wholehearted cooperation of the club, the affair went over with even a louder bang than had been expected.

The exhibit was staged in and about the University Hut. On the exterior of the Hut and surrounded by a ring of hastily planted conifers, several forestry practices and object lessons were situated. A model camp, tempting in its allurement, first attracted the eye and gave to the event an atmosphere of rustic comfort. What was the difference even though a prevalence of snowshoes emphasized an equally great absence of snow? Anyone familiar with "Spike" Gregory's sense of humor could easily understand that. Which reminds me ————.

A further element of humor was added by this same Gregory and "Devildog" Hatch's dog—the latter was an animated sandwich-dog, informing the world of our exhibit, and "Spike's" pegleg bore a placard which conveyed the information that it too was made of wood.

But to continue—banked up against the building an erosion experiment, built up to depict the value of forest cover to land surface and to watershed purposes, illustrated the importance of that problem. The designer, Warren Bolles, also acted as barker for the act, and told in glowing terms the usefulness of tree-covered elevations.

It had as a neighborly rival a model forest in charge of Bob McLaughlin, which demonstrated clearly the effect of scientific management in logging operations. A miniature logging railroad and millpond with log decks and cut-over areas aptly told of lumbering practices. A well located lookout station overlooked the surrounding area, thanks to the jackknives of several wood-carving foresters.

Foresters Saling and Spence, sawed much lumber and created many piles of sawdust with the model sawmill loaned thru courtesy of the Higgins Machinery Company of Seattle, Washington. This event attracted especial attention as did the demonstration of the Northern Fire Pump, which was the pampered pet of Johnnie Baird. Outside of drowning a couple of wide-eyed spectators, no other casualties took place during this feature of the show.

Still another event that kept the audience enraptured was the log sawing contest. Mr. E. F. Mitchell, representing the Atkins Saw Company, kindly put on this exhibit, in which several teams were entered. First place was won by Bentz and J. Space. The saw used by them was buckled and partially melted when this event was completed.

"And now, folks, please step aside. We have here," sang out the announcer. What have we? Ah! Look! The whole main room was lined with exhibits, each portraying some particular field of endeavor in forestry. There

was an exhibit of wood preservative devices and materials, beginning with creosoting apparatus, following the initial exhibit of a collection of lumbering tools and appliances used in the field.

Lewis Cummings brought tears to the eyes of his audience as he told of a tree's destruction and the final products emanating from the ruin. Pulpwood, matting, chemicals and what not illustrated the practices of by-product workers.

"Spike" Gregory's fearless lassoing of a galloping charger thrilled the awe stricken onlookers. And when he demonstrated how a diamond hitch should be thrown upon a vicious pack animal, a mighty cheer echoed throughout the hall. After that example of mighty prowess, our patrons were willing for anything to happen.

It did—"Bung" Snow and Bill Guernsey sold them a lot of blister rust propaganda. With jars of examples and a multitude of pictures they harangued a guileless public. They went so far as to illustrate how one sneaks upon an unsuspecting blister and not content with that, they distributed literature to keep the visitors interested after they had departed.

Surrounded by plane tables, scale sticks, hypsometers, and other mensuration equipment, an Osborne fire finder attracted the public gaze. Here Williams and Olsen kept one eye on the bystanders who acted as tho they believed these keepers of the Abney, and the other eye searching the crowd for Prof. Nettleton, who could have spoiled a good thing had he been so inclined.

The photographs of national forest scenic beauties loaned by the Forest Service were exceedingly popular and caused much favorable comment. Likewise the fine collection of forest views and game pictures kindly loaned by Don Fisher, enhanced the attractiveness of the exhibit and brought forth envious glances of approval.

Forest Service signs, typical of forested areas, cast their influence for forest protection, thruout the exhibit and caused the foresters at least to feel at home. It is impossible to tell everything that occurred; a constant stream of spectators witnessed and enjoyed the exhibit.

After the majority of the audience had passed thru, two reels of pictures were shown. One depicted the activities of the blister rust campaign thruout the northwest and the other was of the scenic attractions in the various national forests of Montana.

We cannot but feel that the Exhibit was a huge success and hope that those who saw it enjoyed it as greatly as we desired that they should.

FORESTERS' ANNUAL BANQUET

Ralph B. Ross, '27

On the evening of March 3, 1925, one hundred and five foresters and guests sat down to the ninth annual banquet of the Associated Foresters. The scene of this event took place in the new Blue Bucket Inn and the men were gathered from the four corners of the globe.

Everything from fruit cocktail to roast pork and hot rolls was set before the hungry foresters and their over-worked nerves were soothed thruout the banquet by the gentle strains of a campus orchestra.

When the last man had leaned back in his chair and sighed, the program for the evening began. Prof. C. W. Watson acted in the capacity of toastmaster, and the witty remarks he used in introducing the various speakers made many of the foresters throw fits of laughter.

The various speakers on the program and their subjects were Rev. H. O. Perry, "An Amateur's Appreciation of Reforestation"; Elers Koch, "The Forest Service in Idaho"; Geo. N. Lamphere, "Forestry and the Business Man"; Ben E. Bush, "The New Idaho Forestry Law"; Dean Ivan C. Crawford, "My Observations of Forestry"; L. F. Parsons, "A Brief History of the Lumber Industry In This Vicinity"; and Kenneth Dean who gave a monologue in which he recounted his experiences when coming west last fall.

At the stroke of ten by Prof. Watson's Ingersoll, the banqueters filed out of the hall with the happy and contented feeling that the ninth annual banquet was the most successful ever given.

THE FIRST ANNUAL FORESTERS' SMOKER

H. I. NETTLETON
Instructor of Forestry

The first annual smoker of the Associated Foresters was held in the University men's gymnasium on Friday evening, November 21. The program started with an obstacle race with a single entry from each class stripped to his B. V. D.'s and required to gallop from one end of the gym to the other in search of sox, shirt, trousers, and coat, in the order named. Cranston, sophomore, won the event with Snow of the senior class a close second.

Hoffman and Vickrey, underclassmen, tried in vain to wear each other down in the next event, a three round boxing contest refereed by "High Power" Ross and resulting in a draw. After the bloody arena had been sprinkled with clean sand, H. P. Magnuson of the College of Agriculture, tickled the funnybones of the Foresters with his Swedish monologues.

Hatch and Phelps, representing the sophomore and junior classes respectively, then proceeded to sidetrack each other's noses with the leather mittens, but again the referee called a draw match. As a change from the gory spectacle just enacted, Renshaw of the seniors soothed the racing blood of the crowd with several well played selections on his banjo.

The next number was a junior event, in which Lansdon and Williams pushed and punched their way to the third boxing draw of the evening, after which the Gym was suddenly enveloped in Stygian darkness.

When the lights came on again, the crowd was electrified to find a demure dancing maiden, alias "Spike" Gregory, gracefully pirouetting, pivoting, and swinging to the wild, weird notes of the Boston pianist, Ted Seely. "Madame" Gregory's performance left the crowd almost too breathless to cheer the principals in the next event—a wrestling match between Ward and Stahl, in which Ward suffered a brokrn foot and retired. Then referee Ross called Downer and Greer on the mat for a second wrestling bout in which Downer won with a fall in just 30 seconds.

Erickson, presumably fresh from Sweden's distant shores, then entertained the club with several recitals of his experience upon arrival in America.

The next event was a tumbling stunt featuring "Polly" Lehrbas, "Bud" Bliss, and "Red" Pendergrast. These men put on a clever and well balanced act which well deserved the reception it received.

While cider, pretzels, cake and cookies were being placed for the final act, Heggie and Gregory shook the floor with their clogging shoes and when the "eats" committee invited the eighty odd foresters to "come and get it" they needed no second invitation. Thus ended the first annual Foresters' Smoker.

XI SIGMA PI

Lewis Cummings, '25.

Xi Sigma Pi was instituted in 1908 on the Campus of the University of Washington, but it was not until 1915 that it became the national honorary forestry fraternity as it exists today. There are now eight active chapters of Xi Sigma Pi extending from coast to coast, while petitions are received each year from the different forestry schools of the country for chapters in their respective schools.

Epsilon Chapter of Xi Sigma Pi was established at the University of Idaho in 1920. The class of '25 can boast of having all its members in this fraternity.

The objects of the fraternity, to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry, and to promote fraternal relations among earnest workers engaged in forest activities, have always been uppermost in the selection of new members.

To better further the ideals of high scholarship among the students enrolled in the School of Forestry, Xi Sigma Pi purchased a bronze tablet of beautiful and artistic design, upon which each year the names of the freshman, sophomore, junior, and senior who have attained the highest average in their respective classes are placed. This tablet is

hung in a conspicuous place in the Administration building and is splendidly fulfilling the purpose for which it is intended.

The students whose names are now engraved on the plaque and the years they attained the highest scholastic average of their class are listed as follows:

1922—James W. Farrell, senior; Russel M. Parsons, junior; Arthur M. Sowder, Sophomore; Paul H. Harlan, freshman.

1923—Albert S. Daniels, senior; Ralph S. Space, junior; Paul M. Harlan, sophomore; Floyd W. Godden, freshman.

1924—Rodgers G. Wheaton, senior; Robert P. McLaughlin, junior; Floyd Godden, sophomore; Henry Hoffman, freshman.

To be eligible for membership into Xi Sigma Pi, a student must have completed two and one-half years of standard college work in an approved School of Forestry, three-fourths of his grades shall have been above 80 per cent, and he shall not have received any failures in forestry subjects. He shall also have shown a creditable interest and activity in practical forestry work.

As much weight is placed upon a man's practical ability, such as adaptability to forestry work or lumbering, capacity for leadership, and promise of attainment, as is placed upon his scholastic work. By this means of grouping and by stimulating the desire of the underclassmen for election to the fraternity it is hoped that the objects of the fraternity may continue to be maintained.

The officers for the year 1924-1925 are: Robert P. McLaughlin, Forester; E. W. Renshaw, Associate-Forester; Lewis Cummings, Secretary-Fiscal agent; and Paul M. Harlan, Ranger.

The members of the faculty of Xi Sigma Pi include: Dean F. G. Miller, Dr. Henry Schmitz, Clarence Watson and Harry I. Nettleton.

The new members initiated April 3 are: Des Raj Malhotra, '25; Clarence C. Olsen, '26; Eugene V. Phelps, '26; Mark Lehrbas, '26; W. H. Bolles, '26; and Eugenio de le Cruz, '26.

LECTURERS SPEAK TO FORESTERS

E. W. Renshaw, '25

Following the plan of the School of Forestry several speakers were obtained each to deliver a series of lectures during the past school year. Mr. L. C. Hurtt, Supervisor of the Nez Perce National Forest, was here during the week of February 23-28 and spoke to the students on Range Management. Besides explaining the problems incident to a grazing forest Mr. Hurtt threw some interesting lights on the possibilities of this phase of forestry as a professoin. Our embryo grazing assistants took a new lease on life after hearing Mr. Hurtt, and decided that they were not as far wrong in their choosing of a college course as some of their logging engineer classmates had tried to lead them to believe.

Mr. Elers Koch of the District Office, U. S. Forest Service, Missoula, Montana, delivered a series of lectures during the week beginning March 2. Mr. Koch took as his topic, Management Plans, and explained fully the plans necessary to put and keep a forest on a sustained yield basis, using as examples the management plans of the Kaniksu, Coeur d'Alene and other national forests. These lectures were delightfully instructive and were highly appreciated by the members of the senior class.

We were fortunate in having with us from March 16-21, Mr. Lyle F. Watts, who spoke on the management of yellow pine. Mr. Watts, who is supervisor of the Idaho National Forest, has had much experience in forests of this type and his lectures plainly showed that he was thoroly familiar with his subject. He is a very easy and interesting talker and we hope we may be privileged to hear him again.

On March 23, 24 and 25, Mr. James C. Evenden, Associate Entomoligist, Bureau of Entomology, U. S. Department of Agriculture, spoke to us relative to the depredations on our western forests caused by insects. Mr. Evenden's stay was all too short to enable him to treat his subject as fully as its importance deserves. Mr. Evenden has the happy faculty of making his talks extremely interesting, and, in the parlance of the classroom, of getting them across.

WHERE THE BOYS WILL BE THIS SUMMER

RALPH S. SPACE, '25

Graduating Seniors

Lewis A. Cummings passed the junior forester examination and has accepted an appointment on the Washakie National Forest, Lander, Wyoming.

Paul M. Harlan plans to go into private work and his address at present is 1070 Monadnock, Bldg., San Francisco, Calif.

Des Raj Malhotra will sail about July 1 from Seattle for his home in India where he has an appointment with the Indian Forest Service.

Robert Penfield McLaughlin will be engaged for the summer with Prof. Watson in white pine growth studies near Clarkia, Idaho, and will enter the Yale Forest School this fall for post-graduate work.

Emera W. Renshaw has received an appointment as deputy forester for the state of Idaho and will have his office in Moscow, Idaho.

Elva A. Snow passed the junior forester examination and is in receipt of an appointment as junior forester on the Medicine Bow National Forest, Wyoming. His address is U. S. Forest Service, Laramie, Wyoming.

Arthur M. Sowder will be engaged in forestry work in northern Idaho and can be reached thru his home address, 424 Garden Avenue, Coeur d'Alene, Idaho.

Ralph S. Space passed the junior forester examination and has received an appointment on the Blackfeet National Forest, with headquarters at Kalispell, Montana.

Juniors

Warren H. Bolles will be employed on the Payette National Forest in timber reconnaissance.

William E. Buckingham will continue his work as forest ranger on the Clearwater National Forest at Musselshell Ranger Station, Weippe, Idaho.

William C. Callender, whose home address is 1606 N. 12th St., Boise, Idaho, will spend the summer working in logging camps on the coast.

Eugenio de la Cruz will spend the summer in Alaska.

Ivan S. Doyle will be in Moscow for the summer to attend the summer session of the University.

Walter D. Field will attend the R. O. T. C. camp at Camp Lewis, Wash., and then work at Coeur d'Alene, Idaho, in a sawmill.

Charles E. Fox will be employed on the Selway National Forest in timber reconnaissance work. His address will be Lowell, Idaho.

Orin S. Gudmunsen has accepted employment for the summer at the Great Basin Experiment Station, Ephraim, Utah.

William G. Guernsey will be employed in blister rust reconnaissance work with headquarters at 618 Realty Bldg., Spokane, Wash.

Clifford Hunter expects to resume his work on the Coeur d'Alene National Forest, Coeur d'Alene, Idaho.

Collis Huntington will be on the Nez Perce National Forest out of Grangeville, Idaho.

Prino Icarangal will register in the University of Idaho summer school.

Richard Johnson plans on attending the summer session of the University.

William H. Lansdon has accepted employment with the Potlatch Lumber Co., at Elk River, Idaho.

Mark A. Lehrbas is returning home to Pocatello where he has accepted employment for the summer.

Clarence C. Olsen has received a summer appointment in grazing work and his address will be c/o the U. S. Forest Service, Forsyth, Montana.

Eugene Phelps will be with Prof. Watson making studies of the growth of white pine. His address will be Clarkia, Idaho.

Lawrence Pugh plans to be with the Hopkins Bros. Timber Co., as clerk and check scaler with headquarters at Enaville, Idaho.

Ralph B. Ross tells us he is to work as a smokechaser on the Selway National Forest, Kooskia, Idaho.

Valentin Sajor will attend summer school of the University.

Arlie Toole has accepted work as trail foreman under William E. Buckingham for the summer. His address will be Weippe, Idaho.

Fairly Walrath will be employed on the Clearwater National Forest with headquarters at Orofino, Idaho.

Harold Z. White will be with Prof. Nettleton this summer making studies on increased growth of white pine after logging. Mail addressed c/o the School of Forestry will reach him.

Guy Williams will be engaged in fire protection work on the Clearwater National Forest, Orofino, Idaho.

Sophomores

Fred R. Allen will spend the summer on the Snoqualmie National Forest in Washington, and his address is Lester, Washington.

Elmo Allgood expects to work in the forests in Utah but says mail addressed to him at 243 West Sixth No. Street, Salt Lake City, Utah. will reach him.

Lester Bai will work for the Utah Ice and Storage Company, Salt Lake City, Utah, and his address is 923 Princeton Avenue, Salt Lake City.

John C. Baird has accepted employment in forest protection work for the Edward Rutledge Timber Co., Clarkia, Idaho.

Wilfred Beals will be employed for the summer as lookout on the Chelan National Forest, Okanogan, Wash.

Carey Bennett plans to resume his duties with the U. S. Forest Service.

Isaac Burroughs will be engaged in forest protection work for the Edward Rutledge Timber Co., Clarkia, Idaho.

William V. Cranston will work as smokechaser for the Selway National Forest, Kooskia, Idaho.

Virgil Crawford will be employed on the Selway National Forest, Kooskia, Idaho, on trail work.

Francis Gordon Ellis expects to spend the summer working on the Selway National Forest, Kooskia, Idaho.

Melvin Fuller will be located with the Clearwater Timber Co. doing protection work with his address at Orofino, Idaho.

Edwin G. Greene will work as smokechaser on the Clearwater National Forest, Orofino, Idaho.

Chas. A. Gregory will be with the Edward Rutledge Timber Company, Clarkia, Idaho.

Carl Gustafson has accepted employment on the Nez Perce National Forest, with headquarters at Grangeville, Idaho.

Alden Hatch is returning to the Idaho National Forest for the summer. His address will be c/o U. S. Forest Service, New Meadows, Idaho.

Tracy Heggie tells us he will be with the U. S. Forest Service again this summer.

Henry Hoffman gave us his summer address as c/o Musselshell Ranger Station, Weippe, Idaho. He will work for the Forest Service.

Royal H. Johnston will be crew foreman for the Blister Rust Control work, Coolin, Idaho.

Earl Moulton will attend summer military camp at Camp Lewis, Washington.

Galen W. Pike will be employed in Ribes eradication work, White Pine Blister Rust control, Coolin, Idaho.

Oral O. Ross is returing for the summer to his home in Long Beach, Cal., 2225 Perkins Avenue.

Wallace M. Saling has accepted employment as trail crew foreman on the Clearwater National Forest. His summer address will be Musselshell Ranger Station, Weippe, Idaho.

Jackson S. Space will work for the Clearwater Timber Co., as lookout near Orofino, Idaho.

Liter E. Spence will resume his work as commissary clerk, Clearwater National Forest, Superior, Montana.

Freshmen

Wm. L. Anderson will be employed on the Selway National Forest in trail work out of Kooskia, Idaho.

Raymond Baldwin plans to spend the summer at his home in Twin Falls, Idaho.

Charles Bentz will work on the Nez Perce National Forest as lookout. His summer address will be Grangeville, Idaho.

J. Bernal Biker will be engaged in timber cruising for the British Columbia Forest Branch, Nelson, B. C., Canada.

Irvin Campbell will be on trail work on the St. Joe National Forest with headquarters at Avery, Idaho.

Chas. Connaughton expects to spend the summer working in the woods.

Victor M. Craig informs us that he will be employed as timekeeper on the St. Joe National Forest, Avery, Idaho.

Kenneth Dean will be engaged in timber survey work in the Adirondack Mountains, New York. His home is Dresden, New York.

Ernest R. Downer will work on the St. Joe National Forest doing trail work. His address will be c/o U. S. Forest Service, St. Maries, Idaho.

Henry Fischer will be employed by the Blister Rust Control Office at Priest River, Idaho.

Gordon Flack is going on the Selway National Forest, Kooskia, Idaho, for the summer to work on trail construction.

Levi M. Frost will work on the Nez Perce National Forest out of Grangeville, Idaho.

George Garmo will be employed by the Loughboro Cedar Co. in shingle manufacture with his address as Greys Creek, Canada.

Harlin Gillett will be with the boys doing trail work on the St. Joe National Forest out of Avery, Idaho.

Vincent Hasfurther states he will work for his parents near Genesee, Idaho.

Irvin Haut will be kept busy on the St. Joe National Forest with trail work and his address will be Avery, Idaho.

Neil Hedrick can be reached at Willapa, Wash., where he will work for his father.

Hugh H. Hughes will spend the summer in Los Angeles, Calif., assisting his father in the carpenter trade.

Floyd McKim will be engaged in trail work for the Selway National Forest, Kooskia, Idaho.

William Mitchell will be employed as ticket agent for the Wilmington Steamboat Co., Wilmington, Del.

Milford Page is going with Prof. Nettleton this summer to make studies on increased growth of white pine after logging. His address will be c/o School of Forestry.

Charles Rector says he has accepted employment on the Nez Perce National Forest doing trail work and his address is Grangeville, Idaho.

Darrel P. Rigney will be engaged in farming at Jerome, Idaho.

Jesse W. Rigney will be employed in Blister Rust Control work at the summer camp, Priest River, Idaho.

Theodore A. Seely will spend the summer as smokechaser for the Selway National Forest, Kooskia, Idaho, under Ranger Ralph Hand.

Earle Stahl is working at Rigby, Idaho.

Charles Stroud will work this summer at trail work on the Nez Perce National Forest, Grangeville, Idaho.

A. Byrd Sumsion expects to be busy with grazing reconnaissance on the Fish Lake National Forest, Chester, Utah.

Robert Ward will work on the Clearwater National Forest doing trail work. His address is Orofino, Idaho.

Rex Wendle will spend the summer working for the Humbird Lumber Co., in the sawmill at Sandpoint, Idaho.

Floyd Williams will be near Coolin, Idaho, employed by the Office of White Pine Blister Rust Control.

AMONG THE EDITORS

THE ASSOCIATED FORESTERS

The Associated Foresters, under the able leadership of its officers for the past year, have enjoyed one of the most successful years of its organization. President Buckingham, because of his duties as a ranger in the Clearwater Forest, could be with us only during the first semester but he established a program for the year that was well carried out by the other members of the staff, Clarence C. Olsen, vice-president, and Robert P. McLaughlin, secretary-treasurer.

Many meetings were held thruout the year and the group, which was very cosmopolitan in character, showed a decided interest in the work of the organization. The roster this year carried a total of 127 foresters and this included men from twenty-four states, the Philippine Islands, Canada and India.

At one of the early meetings of the year Dean F. G. Miller, gave a very interesting talk on the conference held by Forest Service men and forest school heads in Washington, D. C. Many of the other meetings were called for the purpose of hearing the special lecturers, their talks being mentioned elsewhere in this publication.

The club went on record as hereafter supporting the several important functions as follows: Dance in the early fall, smoker in the winter, followed by the banquet given after the beginning of the second semester and the barbecue just before school closes in the spring. These events, with the regular business meetings, call for a very full schedule. It is planned next year to have a regular place for gathering for the meetings and the officers for next year have already started work on the establishment of a forestry museum. The Foresters selected to head the organization next year are Clarence C. Olsen, president; Harold Z. White, vice-president; and Warren H. Bolles, secretary-treasurer.

FORESTERS ANNUAL DANCE

The Associated Foresters of the University of Idaho have earned the reputation of holding one of the outstanding all-college dances of the year and this year was no exception to that honor. Due to a football game held in Spokane the same day as our dance, October 4th, 1925, and several other campus dances the same evening, the crowd was not as large as in former years but to say the dance was a success would be putting it mildly.

The University gymnasium was literally transformed into a coniferous forest, and around the edges of the floor were placed neatly arranged campfires, camping equipment, fire fighting material, etc. Numerous placards scattered about the trees informed the dancers the importance of saving and protecting our forests. The punch booth was set up at one end of the floor and the two forester attendants were kept continually on the go to satisfy the dancers with delicious liquid refreshments. Streamers of branches and boughs formed a closed canopy over the dancers' heads and the orchestra, screened off with trees, supplied the necessary music for the 130 odd couples.

The program was perhaps the most elaborate ever made up by the foresters. The first page inside the cover contained a poem by Joyce Kilmer and each dance carried a line of a poem composed by Mrs. Robert P. McLaughlin. The patrons and patronesses for the affair were Mr. and Mrs. Alfred H. Upham, Miss Permeal J. French, Mr. and Mrs. Francis G. Miller, Mr. and Mrs. Henry Schmitz, Mr. and Mrs. Clarence Watson, and Mr. and Mrs. Harry I. Nettleton.

ASSOCIATED FORESTERS STAGE ESSAY CONTEST

To stimulate interest among the high schools of Idaho in American Forest Week, the Associated Foresters, this year, put on an essay contest, offering $30.00 in prizes to the three students writing the best essays on the subject: "Why Idaho Should Perpetuate Her Forests." This contest was open to all students under 18 years of age, regularly enrolled in the high schools of the state the past year.

Nearly twelve hundred students from various sections of the state entered the contest and according to letters received from high school principals and students much enthusiasm was aroused in the importance of our great forest resources, not only on the part of the participants, but their teachers and parents as well. So successful was the undertaking that the Idaho Associated Foresters plan to sponsor such a contest each year as a part of their contribution to the observance of American Forest week.

The judges and prize awarding committee consisted of Clarence C. Olsen, President, Idaho Associated Foresters; F. G. Miller, Dean, School of Forestry, University of Idaho; and James Boone, Assistant State Attorney General, Boise, Idaho. Dr. Henry Schmitz, Professor of Forest Products, School of Forestry, University of Idaho, acted as referee.

Following are the winning contestants:

First prize, $15.00, Margaret Warnke, Boise.

Second Prize, $10.00, Dorothy Robel, Sandpoint.

Third prize, $5.00, Glenn Wright, Gannett.

First honorable mention, Florence Auxier, Meridian.

Second honorable mention, Bess Faraday, Mountain Home.

Third honorable mention, Ruth Blackburn, Cottonwood.

AMERICAN FOREST WEEK

Reports received from all parts of the state would indicate that American Forest Week, April 27 to May 3, was very generally observed. Through the courtesy of Miss Elizabeth Russum, state superintendent of public instruction, Arbor Day exercises in the public schools were combined with those for the celebration of American Forest Week, and this plan made it possible to carry out the purposes of both much more effectively.

The Idaho state committee consisted of F. G. Miller, dean, school of forestry, chairman; W. D. Humiston, assistant general manager of the Potlatch Lumber Company, Potlatch; C. A. Barton, general manager of the Boise-Payette Lumber Company, Boise; Ben E. Bush, state forester, Moscow; C. K. McHarg, Jr., supervisor, Coeur d'Alene National Forest, Coeur d'Alene; T. L. Greer, land agent, Humbird Lumber Company, Sandpoint; and Guy B. Mains, supervisor of the Boise National Forest, Boise. In planning the campaign for the observance of the week, the general committee held two meetings—one at Spokane, and the other at Boise. Valuable assistance was given the committee by Theodore Shoemaker and F. S. Baker, both of the U. S. Forest Service; also R. H. Chapler, Western Forestry and Conservation Association, Portland, Oregon,

and Roy R. Myers, Secretary, Spokane Hoo Hoo Club, each of whom sat in with the committee in one or other of its sessions.

Sub-committees consisted of the school program committee with Dr. Henry Schmitz, professor of forest products, acting as chairman; speakers' bureau, C. W. Watson, assistant professor of silviculture, chairman; press committee, C. K. McHarg, Jr., chairman; and advertising committee, A. D. Decker, land agent, Potlatch Lumber Company, chairman.

The school program committee prepared an attractive program of sixteen pages, which carried well selected material for the use of the public schools in celebrating American Forest Week and Arbor Day. An effort was made to put one of these programs in the hands of every public school teacher in the state. Much credit is due the county superintendents for their hearty cooperation with the committee in the task of assisting the public school in putting on these programs.

The speakers' bureau organized an extensive speaking campaign in which it was sought to send speakers to the public schools and the various business and social clubs thruout the state. Reports are not all in at this writing, but it is known the efforts of this committee were very successful. A greater use was made of the radio than in former years. Mr. Theodore Shoemaker of the Forest Service was the general assembly speaker at the University this year, and also addressed the Moscow Chamber of Commerce.

Mr. McHarg for the press committee reports: "The cooperation of the newspapers was very gratifying, all seemed willing to do everything possible to place before their readers the meaning and importance of the week." Mr. McHarg roughly estimates that the space devoted by the press to news items pertaining to American Forest Week was not less than one hundred and fifty column inches per county in the timbered counties of the state.

Donald H. Yates of the Potlatch Lumber Company reporting for the committee on advertising, states that about ten per cent of the merchants in many of the towns responded to an appeal from the committee to run appropriate slogans with their newspaper ads. In a number of places the merchants put on window displays showing the value and uses of the forest. For example, the forestry committee of the Coeur d'Alene Chamber of Commerce inaugurated a window display contest and secured $100 in cash prizes for the displays exhibiting the greatest attractiveness and most educational value. This is an idea that has splendid possibilities and one that should be more widely used.

Besides the problem of fire prevention, the keynote appeal this year was the necessity of a sustained yield of timber if the industries dependent upon a wood supply are to survive, and if the movement to bring new wood-working establishements to Idaho is to succeed. Everywhere in the state there is a growing interest in the state's forest resources, and the importance of perpetuating them.

SCHOOL GETS ENLARGED QUARTERS

Alumni and former students recalling the crowded conditions under which the School of Forestry has been working in the past will be interested to know that the removal of the departments of bacteriology and agricultural chemistry from Morrill Hall to the new Science Hall on its completion this summer will make it possible for the School to expand its present quarters in Morrill Hall to include all of the third and fourth floors, the two floors consisting of sixteen rooms.

On the third floor, one large room will be fitted up as a laboratory for dendrology and wood technology, seating thirty-two students, and a second room as a laboratory for silviculture and range management, also with accommodations for thirty-two students. Another room will be used as a laboratory in wood preservation and timber physics, and a fourth room as a research laboratory for advanced students. The largest room on this floor will be used for large classes and for an assembly room. This room will accommodate over one hundred students. There will also be one smaller class room, while another will be used as a combined small class room, and a general utility room for conferences, committee meetings, etc. Just off from this will be the library and reading room. The offices of the dean, professor of forest products, and of the secretary of the School will also be found on this floor.

The fourth floor will contain one large laboratory for the work in mensuration and logging engineering, one sizable class room, an instrument and storage room, and two offices. The laboratories will each be equipped with up-to-date fixtures especially designed for the particular kind of work in hand. Everything will be in readiness when the University opens in September.

PERSONALS

Word is just received that John H. Zuver, Jr.; Ex-'25, was married to Miss Jessie Mae Wright, June 1. Mr. Zuver is working on a newspaper and gives his home address as 710 Rex Street, South Bend, Indiana.

Stanley Foss Bartlett, (R. C.) '21-'22, has his headquarters at Locke's Mills, Maine, but is still doing art work in that part of the country for newspapers. He recently published a booklet containing poems from his pen. He is known in his country as "The Poet of the Hills".

Kester Flock writes from Pierce City, Idaho, that he is stationed at the Bungalow Ranger Station and expects to be located on Elk Mountain for the summer.

Mr. C. Edward Behre, formerly professor of lumbering of our school of Forestry and now with the U. S. Forest Service at the Northeastern Forest Experiment Station, Amherst, Mass., reported another addition to his family early last fall. This time it was a fine daughter.

Edward T. Nero, '23, was married last winter to Miss Murice McCabe, Plummer, Idaho. Mr. Nero is a ranger on the Clearwater National Forest with headquarters at Orofino.

Frank A. Brown, '22, announced his marriage last fall to Miss Pearl Stalker, '24. California is their state now and their address is 3218 South Hoover St., Los Angeles.

Henry L. Smith, '12-'14, is connected with the U. S. Forest Service at McCall, Idaho, employed as principal clerk. Mr. Smith paid the School of Forestry a visit last winter. He expressed considerable surprise upon the many campus changes that have taken place since his last visit here.

Gail Chamberlain, 'ex-'22, was married last Christmas to Miss Jean Richards of Spokane. Mr. Chamberlain reports his home address as Bend, Oregon, where he is employed by the Brooks-Scanlon Lumber Company.

Jack W. Rodner has been able to pay Moscow several visits thruout the past year. He is connected with the Coeur d'Alene Timber Protective Association doing work along the line of blister rust control.

Fred Chamberlain, Ex-'23, announced his marriage to Miss Edith Dingle, '23, Coeur d'Alene, Idaho, early this spring. They are living at Lynn, Mass., where Mr. Chamberlain is employed as sales manager of the Brockway-Smith Corporation of Boston, Mass.

William H. Godson, who was registered in school last year writes from Lacolle, P. Q., Canada, that he is now resident engineer for the Napierville Junction Railway Company.

Floyd W. Godden, Ex-'27, on his way from Wisconsin to Weippe, Idaho, spent a day or two in Moscow the first week in June. Mr. Godden will spend the summer as commissary clerk at the Musselshell Ranger Station, located near Weippe, Idaho. He will again register in the School of Forestry in September.

J. Warren Stoneman, Ex-'24, writes us that he is now the proud father of a daughter born February 24. He is living with his family near Hillyard, Washington, Route No. 9.

Albert S. Daniels, '23, was married to Miss Margaret M. Macey about a year ago. This is the culmination of a romance started while both were in attendance here at the University. Mr. Daniels last gave us his address as Houston, Texas, where he was connected with the National Lumber and Creosoting Company as assistant superintendent.

Theodore A. Seely, who was registered in school this year was married last summer to Miss Charlotte Crandall. The couple are living in Moscow.

The many friends of Orlin Dean D'Atley, Ex-'27, who was registered in school last year, were grieved to learn of his sudden death last December 31, in Lewiston, Idaho. His death was due to a combination of diseases caused by an attack of influenza.

Norman F. Gillham, Ex-'26, writing from Box 1041, Flagstaff, Arizona, says he is at present employed in a sawmill. He was obliged to drop out about the middle of the first semester and says he will be back next September to complete his work for the degree.

Rodgers G. Wheaton, '24, who spent the past year at Yale Forest School working for his master's degree, arrived at Moscow, June 5, to spend a few days visiting. He will be located in District 1, with headquarters at Livingston, Montana.

William E. Buckingham, Ex-'26, at the close of the first semester was called to his post as ranger of the Musselshell Ranger District Weippe, Idaho.

Chester W. Hills, Ex-'27, writes from Camp No. 7, Big Creek, California, that he is getting

a lot of experience in railroad construction and logging and that he plans to be back in school this fall.

Richard L. Kemp, Ex-'28, tells us that he is working in a sawmill at Spirit Lake, Idaho, his own home town, and will be among those present next fall when school starts.

William Byron Miller, '22, who spent the past year at the University of California taking graduate work in range management, is now located in Alaska where he will be with the U. S. Biological Survey, with headquarters at Fairbanks, Alaska. It has been reported to us that Byron is now a married man, but this is unconfirmed as we go to press.

Edwin C. Rettig, '19, logging engineer for the Clearwater Timber Co., Orofino, Idaho, surprised us recently by engaging in wedlock. His wife was formerly Miss Esther Pearson of Sandpoint, Idaho, and a graduate of the University of Idaho. We understand that's where the romance started.

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1924-1925. The information after each name is in the following order: 1, name; 2, home address; 3, social fraternity; 4, honorary fraternity; 5, scholastic, athletic and campus activities.

Seniors

Cummings, Lewis A.; St. Petersburg, Florida; Xi Sigma Pi.

Gillham, Norman F.; Edwardsville, Illinois; Alpha Tau Omega.

Harlan, Paul M.; Jackson, Tenn.; Kappa Sigma; Alpha Zeta, Xi Sigma Pi; Associate Editor "Gem of the Mountains" '23-'24, Editor '24-'25, Winged Helmet, Silver Lance, Ball and Chain, Glee Club '23-'24.

Malhotra, Des Raj; Jammu, Kashmire State, Punjab, India; Xi Sigma Pi.

McLaughlin, Robert P.; Idaho Falls, Idaho; Acacia; Xi Sigma Pi; Secretary-Treasurer Associated Foresters '24-'25.

Renshaw, Emera W.; Kamiah, Idaho; Phi Gamma Delta; Xi Sigma Pi; Alpha Zeta; Pep Band, Vice President Associated Foresters '23-'24.

Snow, Elva A.; Boise, Idaho; Kappa Sigma; Xi Sigma Pi; Alpha Zeta; Baseball "I" '22, '23, '24.

Sowder, Arthur M.; Coeur d'Alene, Idaho; Sigma Alpha Epsilon; Sigma Xi; Xi Sigma Pi; Alpha Zeta; President Associated Foresters '22-'23. Secretary-Treasurer '23-'24, Editor "Idaho Forester" '24-'25, Silver Lance, English Club, Track "I" '23, '24, '25, Cross Country "I" '24, '25.

Space, Ralph S.; Weippe, Idaho; Xi Sigma Pi; Associate Editor "Idaho Forester" '24-'25. High honors.

Juniors

Bolles, Warren H.; Little Valley, New York; Xi Sigma Pi.

Buckingham, William E.; Gifford, Idaho; Xi Sigma Pi; President Associated Foresters '24-'25.

Callender, William C.; 1606 N. 12th St., Boise, Idaho.

Cruz, Eugenio de la; Lingayen, Pang, Philippine Islands; Xi Sigma Pi.

Doyle, Ivan S.; Moscow, Idaho.

Field, Walter D.; Huston, Idaho; Phi Delta Theta; Baseball "I" '24, '25.

Fox, Charles E.; Utica, New York; Alpha Tau Omega; Joke Editor "Gem of the Mountains" '24-'25.

Gudmunsen, Orin S.; Moscow, Idaho; Sigma Chi; Assistant Business Manager "Idaho Forester" '24-'25.

Guernsey, William G.; Poughkeepsie, N. Y.; Phi Delta Theta; Assistant Business Manager "Idaho Forester" '23-'24.

Hunter, Clifford H.; Coeur d'Alene, Idaho; Phi Delta Theta.

Huntington, Collis H.; Batavia, New York.

Icarangal, Primo E.; Pangil Lag., Philippine Islands.

Lansdon, William H.; Boise, Idaho; Phi Delta Theta; Baseball "I" '24, '25.

Lehrbas, Mark; Pocatello, Idaho; Kappa Sigma; Xi Sigma Pi; Baseball "I" '25.

Olsen, Clarence C.; Seattle, Wash.; Sigma Alpha Epsilon; Xi Sigma Pi; Associate Editor "Idaho Forester" '23-'24, Vice-President Associated Foresters '24-'25, President Sophomore Class '23-'24, English Club, Curtain, Silver Lance, Manager of Dramatics.

Phelps, Eugene V.; Barrington, Illinois; Alpha Tau Omega; Xi Sigma Pi.

Pugh, Lawrence; Springston, Idaho.

Ross, Ralph B.; Gary, Indiana; Alpha Tau Omega; Wrestling "I" '25.

Sajor, Valentin; Cafugas, Ilosos Sur; Philippine Islands.

Toole, Arlie W.; Marshfield, Oregon; Business Manager "Idaho Forester" '24-'25.

Walrath, Fairly J.; Orofino, Idaho; Phi Gamma Delta; Pep Band.

White, Harold Z.; Moscow, Idaho; Xi Sigma Pi.

Williams, Guy V.; Boise, Idaho; Sigma Nu.

Sophomores

Allen, Fred R.; Lester, Washington; Sigma Alpha Epsilon; Glee Club '24-'25.

Allgood, Elmo; Salt Lake City, Utah.

Bai, Lester; Salt Lake City, Utah.

Baird, John Cecil; Chicago, Illinois; Sigma Alpha Epsilon; Rifle team.

Beals, Wilfred F.; Okanogan, Wash.

Bennett, Carey H.; Ogden, Utah.

Burroughs, Isaac C.; Poughkeepsie, N. Y.; Delta Chi; Associate Editor "Idaho Forester" '24-'25; Ball and Chain.

Cranston, William V.; Mt. Vernon, Wash.

Crawford, Virgil O.; Opportunity, Wash.

Ellis, Francis G.; Idaho Falls, Idaho.

Fuller, Melvin F.; Orofino, Idaho; Phi Gamma Delta; Pep Band.

Greene, Edwin G.; Moscow, Idaho.

Gregory, Chas. A.; Chicago, Ill.; Sigma Alpha Epsilon; Frosh Football '24-'25; Rifle team.

Gustafson, Carl A.; Vancouver, Wash.

Hatch, Alden B.; Bryn Mawr, Pa.

Heggie, Tracy L.; Montpelier, Idaho.

Hoffman, Henry C.; Galesburg, Ill.

Johnston, Royal H.; Everett, Mass.

Jones, Merlin V.; Firth, Idaho.

Moulton, Earl R.; Lynn, Mass.; Alpha Tau Omega.

Pike, Galen W.; Woodstock, Conn.

Ross, Oral O.; Long Beach, Cal.

Saling, Wallace M.; Weippe, Idaho.

Space, Jackson W.; Weippe, Idaho.

Spence, Liter E.; Park Ridge, Ill.

Freshmen

Allen, Dale T. ;Cottonwood Falls, Kansas.

Anderson, William L.; Malad, Idaho.

Baldwin, Raymond F.; Twin Falls, Idaho; Alpha Tau Omega.

Bentz, Charles E.; White Bird, Idaho.

Biker, J. Bernal; Nelson, B. C.; Sigma Chi.

Bloom, Lawrence C.; Wallace, Idaho.

Campbell, Irvin A.; Portland, Oregon; Sigma Alpha Epsilon.

Clark, Benton; Moscow, Idaho.

Connaughton, Charles A.; Placerville, Idaho.

Craig, Victor M.; Avery, Idaho; Alpha Tau Omega.

Dean, Kenneth F.; Dresden, N. Y.; Sigma Alpha Epsilon; Frosh Football '24-'25.

DeHaas, Hubert; Cascade, Idaho.

Downer, Ernest R.; Sioux City, Iowa.

Fischer, Henry A.; Mt. Vernon, New York.

Flack, Gordon L.; Spokane, Wash.

Frost, L. Milward; Salina, Kansas.

Fullerton, Claude R.; Duncan, Arizona.

Garmo, George A.; Bellingham, Wash.

Gillett, Harlin W.; King Hill, Idaho.

Greer, Harold P.; King Hill, Idaho.

Hasfurther, Vincent J.; Genesee, Idaho.

Hahn, Fred P.; Spokane, Wash.

Haut, Irvin; Mitchell, South Dakota.

Hedrick, Neil W.; Willapa, Washington.

Hughes, Hugh H.; Los Angeles, Cal.; Phi Delta Theta; Frosh Football.

Jensen, Alfred E.; Caldwell, Idaho.

Johnson, Wilfred; Lowell, Wash.

Kauffman, Alton T.; Orofino, Idaho.

Kieswetter, Oscar M.; Houston, Texas.

Lee, Harold E.; Medford, Mass.; Delta Chi.

McKim, Floyd A.; Lansing, Mich.

Mitchell, William W.; Wilmington, Delaware.

Page, Milford M.; Union Springs, N. Y.

Rector, Charles M.; Bryan, Ohio.

Richardson, John L.; W. Newton, Mass.

Rigney, Darrel P.; Jerome, Idaho.

Rigney, Jesse W.; Jerome, Idaho.

Seely, Theo. A.; Belfast, New York.

Stahl, Earle; Rigby, Idaho.

Stroud, Charles C.; Natchitockes, La.

Sumsion, Byrd; Chester, Utah.

Vickrey, Dwight R.; Firth, Idaho.

Walker, Raymond E.; Ashton, Idaho.

Ward, Robert D.; Bryan, Ohio.

Wendle, Rex; Sandpoint, Idaho; Sigma Nu; Frosh Football, Basketball.

Wiks, David L.; Coeur d'Alene, Idaho.

Williams, Floyd E.; Rosalia, Wash.

Rangers

Beauregard, Clayton; Fillmore, Utah.

Bergman, Harold E.; Bark River, Mich.

Case, George W.; Kooskia, Idaho.

Chambers, Howard J.; Baker, Oregon.

Coleman, William W.; Cascade, Idaho.

Collins, Arthur E.; Vancouver, B.C.

Dawson, Robert B.; Cranbrook, B. C.

Hume, John F.; Nelson, B. C.

Hupe, Andrew M.; Spokane, Wash.

Noyes, Sherman A.; Donard, Wash.
Roat, Celeste A.; Red Lodge, Mont.
Smith, William H.; Tygh Valley, Oregon.
St. Mar, Albert W.; Spokane, Wash.
Tucker, Gerald J.; Elgin, Oregon.
Weinemann, Attlee; Orofino, Idaho.
Wells, Harold E.; Manitoba, Canada.
Whitaker, Clarence; Elba, Idaho.
Whitaker, Frank S.; Elba, Idaho.
Whiting, George M.; Spokane, Wash.

ALUMNI AND FORMER STUDENTS

Anderson, Mark; ex-'15; Provo, Utah; Hotel Manager.
Autrey, Lawrence; (Voc.) '22-'23; Enterprise, Oregon.
Balch, Prentice; ex-'27; E. 703 Wabash, Spokane, Wash.
Baldwin, Wesley; (R.C.) '24; Torrington, Conn.
Bark, Wendolin; ex-'27; Park Ridge, Ill.
Bartlett, Stanley Foss; (R.C.) '21-'22; Locke's Mills, Maine.
Baumann, Herman; B.S. For. '24; Susanville, Cal.; Forester, Fruit Growers' Supply Co.
Bedwell, Jesse Leonard; B.S. For. '20; Assistant Pathologist, Office of White Pine Blister Rust Control, 618 Realty Building, Spokane, Wash.
Berry, Waldo Lee; (R.C.) '15-'16; Post Falls, Idaho.
Biba, Frank J.; (R.C.) '24; Des Plaines, Ill.
Bieler, Paul S.; (R.C.) '21-'22; 2903 Washington Ave., Ogden, Utah, Ass't. Photographer, Engineering Department, Southern Pacific Railroad Co.
Braun, Otto; (R.C.) '22-'23; Burley, Idaho.
Brockman, Cecil C.; ex-'23; Bickelton, Wash.
Brown, Frank A.; B.S. For. '22; 3218 S. Hoover St., Los Angeles, Calif.
Burns, Robert Owen; ex-'15; 625 Hoymount Ave., Fagetteville, N. C.
Chamberlain, Edwin Wm.; ex-'26; U. S. Military Academy, West Point, N. Y.
Chamberlain, Fred; ex-'23; Lynn, Mass.; Sales Manager Lumber Dep't., Brockway-Smith Corporation.
Chamberlain, Gail B.; ex-'22; Bend, Oregon; Brooks-Scanlon Lumber Co.
Chenoweth, Worth; (R.C.) '24; Progress, W. Va.
Clark, George W.; (Voc.) '22-'23; Route 2, Box 25, Touchet, Wash.
Clegg, Martello; ex-'27; Heber, Utah.
Cochrell, Albert N.; (R.C.) '22; Fire Assistant, Clearwater National Forest, Orofino, Idaho.
Connors, John D.; ex-'26; Prichard, Idaho.
Cook, Jacob Miller; ex-'20; Oberlin, Kansas.
Coolbrath, Donald S.; ex-'26; 241 Sixth St., San Francisco, Cal.
Cossitt, Floyd M.; ex-'24; Junior Forester, Selway National Forest, Kooskia, Idaho.
Cowan, Talmadge D.; (R.C.) '15-'16; Ranger, U. S. Forest Service, Targhee National Forest, St. Anthony, Idaho.
Cunningham, Russel N.; B.S. For. '17; U. S. Forest Service, Missoula, Montana.
Daniels, Albert S.; B.S. For. '23; Assistant Superintendent, National Lumber and Creosoting Co., Houston, Texas.
Darnall, Glen McClellan; ex-'16; Payette, Idaho.
Dart, Glenn C.; (R.C.) '24; Dartford, Wash.
Daugherty, Charles Ira; ex-'22; Challis, Idaho.
Davis, Roscoe Richard; ex-'21; Ranger, U. S. Forest Service, Ogden, Utah.
Decker, Arlie Delos; B.S. For. '13; M. F. (Yale University) '17; Land Agent, Potlatch Lumber Co., Potlatch, Idaho.
Denning, Stewart K.; ex-'13; Sales Manager, Panhandle Lumber Co., Spirit Lake, Idaho.
Dipple, Ralph; ex-'14; Dentist, Springfield, Oregon.
Dodge, Keith Allen; (R.C.) '15-'16; Challis, Idaho.
Drissen, Frank J.; ex-'27; Harrison, Idaho.
Drissen, J. Phillip; B.S. For. '21; Ranger In Charge, Logging Operations, Mescalero Indian Reservation, Mescalero, New Mexico.
Eby, Lester W.; (Voc.) '22-'23; Walla Walla, Wash.
Eddy, Leslie E.; ex-'24; Ranger, Clearwater National Forest, U. S. Forest Service, Orofino, Idaho.
Edwards, Kenneth D.; Nampa, Idaho.
Evans, Philip Smith; ex-'20; Preston, Idaho.
Farrell, James W.; B.S. For. '22; Forest Examiner, U. S. Forest Service, McCall, Idaho.
Favre, Clarence E.; B.S. For. '14; M.S. For. '15; Supervisor, Wyoming National Forest, U. S. Forest Service, Kemmerer, Wyo.
Fenn, Lloyd Alfred; B.S. For. '11; Kooskia, Idaho; Attorney at Law, Manager "Kooskia Mountaineer."

Ferguson, Ray S.; (Voc.) '22-'23; Ranger Selway National Forest, U. S. Forest Service, Kooskia, Idaho.

Flock, Kester D.; ex-'27; Bungalow Ranger Station, U. S. Forest Service, Pierce City, Idaho.

Flyg, Carl J.; (R.C.) '20-'21; Blackfoot, Idaho, Indian Service.

Folsom, Frank B.; (Voc.) '20-'22; Ranger, U. S. Forest Service, Colville National Forest, Republic, Wash.

Fuller, Harry E., ex-'25; Emmett, Idaho.

Garner, Lawrence Henry; (R.C.) '22-'23; Midvale, Idaho.

Gatley, Howard A.; ex-'27; Boy Scout Executive, Terre Haute Council Boy Scouts of America, Terre Haute, Indiana.

Gerhart, Carl Wm.; ex-'26; Merrill, Wisconsin.

Gerrard, Paul H.; B.S. For. '23; Assistant Supervisor, Clearwater National Forest, Orofino, Idaho.

Gilman, John Elmo; ex-'19; Obsidian, Idaho, via Stanley.

Godson, William H.; ex-'27; Resident Engineer, Napierville Junction Railway Company, Lacolle, P. Q., Canada.

Hall, Charles W.; ex-'26; McMinnville, Ore.

Hallcraft, Vernon Ralph; (R.C.) '20-'22; U. S. Forest Service, Emmett, Idaho.

Hamel, Joseph Henry; (Voc.) '22-'23; U. S. Veterans' Hospital, Walla Walla, Wash.

Hamilton, Wm. Howard; Ex-'22; Santa Paulo, Cal.

Hammond, Geo. M.; ex-'20; Bowerman Lumber Co., Glendale, Cal.

Hand, Ralph L.; (R.C.) '20-'22; Ranger, Selway National Forest, Lowell, Idaho.

Hansen, Louis W.; ex-'27; Park Ridge, Ill.

Hanzen, Maurice Henry; ex-'20; Box 904, Kellogg, Idaho.

Headrick, Ralph Alonzo; (R.C.) '16-'17; Emmett, Idaho.

Heard, Herman Claude; ex-'13; County Agent, Phoenix, Arizona.

Herman, Charles Henry; B.S. For. '13.

Higgins, Howard H.; (Voc.) '22-'23; Ranger, Nez Perce National Forest, Grangeville, Idaho.

Hills, Chester W.; ex-'26; Camp No. 7, Big Creek, Cal.

Horton, Gerald S.; ex-'27; Clyde, N. Y.

Humphrey, Clyde Pearson; ex-'17; State Highway Department, Coeur d'Alene, Idaho.

Huestis, Clarence; (R.C.) '16-'17; Council, Idaho.

Hutchins, John E.; ex-'27; Spokane, Wash.

Jackson, Tom; B.S. For. '19; Woods Superintendent, Fruit Growers' Supply Co., Susanville, Cal.

Jensen, Irving R.; (R.C.) '16-'17; U. S. Forest Service, Essex, Mont.

Johanson, Robert; (R.C.) '20-'21; Ranger, U. S. Forest Service, Orofino, Idaho.

Johnston, Herbert Wm.; ex'17; U. S. Biological Survey, Unalakleet, Alaska, Range Investigations.

Jones, Rinaldo Vincent; ex-'15; Albion, Idaho.

Kambridge, Antone; ex-'16; Genesee, Idaho; Farmer.

Kayler, Dean C.; (R.C.) '24; Bungalow Ranger Station, Pierce City, Idaho.

Kelly, Robert C.; (R.C.) '20-'22; Bradford, Pa.

Kelso, Jean Everett; (R.C.) '24; San Francisco, Cal.

Kemp, Richard L.; ex-'27; Spirit Lake, Idaho.

Kent, Howard A.; ex-'25; Bonners Ferry, Idaho.

Keyes, Geo. W.; ex-'22; Challis, Idaho.

King, Leonard A.; (R.C.) '20-'21; Orofino, Idaho.

Kiser, Wm. L.; (R.C.) '22-'23; Weiser, Idaho.

Krim, Ben; ex-'24; Newark, New Jersey.

Lawrence, H. Wayne; ex-'26; Jerome, Idaho.

Lefler, Lowell T.; (R.C.) '24; Kamiah, Idaho.

Lewis, Leroy W.; (R.C.) '22-'23; Weippe, Idaho.

Lommason, Thomas; ex-'17; Grazing Assistant, U. S. Forest Service, Missoula, Montana.

Luby, Lawrence L.; (Voc.) '22-'23; Idaho Falls, Idaho.

Lundburg, Wendell Stanley; ex-'26; Idaho Falls, Idaho, R. F. D. No. 3.

Lundstrum, F. J.; B.S. For. '11; 633 Shatto Place, Los Angeles, Cal.

McKinney, Clark P.; (R.C.) '22-'23; Salmon, Idaho.

McMillan, Carleton W.; (R.C.) '24; St. Maries, Idaho.

McMullin, Geo. Leiby; ex-'18; 251 Bush St., San Francisco, Cal., Stationery Specialties.

McNett, Gail, Jr.; ex-'16; Rathdrum, Idaho.

Madlinger, Geo. J.; ex-'24; Poughkeepsie, N. Y.

Malmsten, Harry Elof; B.S. For. '17; Instructor in Grazing, Division of Forestry, University of California, Berkeley, Cal.

Man, Dasaundha Singh; ex-'25; India, Davis, Cal.

Markham, Murl J.; ex-'24; Elks' Club, Missoula, Montana.

Martin, Ernest M.; (R.C.) '19-'20; Weiser, Idaho; U. S. Forest Service.

Martin, Paul J.; ex-'19; Old National Bank Building, Spokane, Wash.; Liverpool and London Globe Insurance Co., Ltd.

Maxwell, Ben C.; (R.C.) '22; U. S. Forest Service, Wenatchee, Wash.

Melchisedeck, L. H.; (Voc.) '22-'23; Sisters, Oregon.

Melick, Harvey Ivan; B.S. For. '23; Nampa, Idaho.

Melzian, Wesley; (R.C.) '21-'22; Onamia, Minn.; Teacher, Mille Lacs Indian Reservation.

Miller, Robert A.; ex-'22; Manager, Retail Yard, National Park Lumber Company, Arco, Idaho.

Miller, Wm. Byron; B.S. For. '22; U. S. Forest Service, Fairbanks, Alaska.

Montroy, Edward H.; ex-'26; Bryant, Wash.

Moody, Virgil Carlton; B.S. For. '17; Ranger, U. S. Forest Service, Coeur d'Alene, Idaho.

Morgan, Roy; (R.C.) '24; Heise, Idaho.

Morris, Leo Francis; ex-'16; Real Estate, 408 Savings and Loan Building, Spokane, Wash.

Morrison, Frank Bernard; ex-'22; Barber, Idaho.

Munson, Oscar C.; B.S. For. '21; Southern Telephone Co., 923 S. Union Avenue, Los Angeles, Cal.

Myrick, E. H.; ex-'17; Supervisor, Lewis and Clark National Forest, Choteau, Mont.

Nero, Edward T.; B.S. For. '23; Ranger, Clearwater National Forest, Orofino, Idaho.

Newkirk, Edwin Ely; (R.C.) '16-'17; Railway Mail Clerk, St. Louis, Mo.

Nonini, Amerigo Louis; (R.C.) '16-'17; Mackay, Idaho.

Osborne, Ira Dean; (R.C.) '24; Orofino, Idaho.

Parsons, Ralph Howard; ex-'14; Ranger, U. S. Forest Service, Coeur d'Alene, Idaho.

Parsons, Russell M.; B.S. For. '24; Pacific Lumber Co., Scotia, Cal.

Patrie, Carthon Roy; B.S. For. '22; Office of White Pine Blister Rust Control, 618 Realty Bldg., Spokane, Wash.

Potter, Arthur; (R.C.) '24; U. S. Forest Service, Ola, Idaho.

Poynor, Neal E.; (R.C.) '21-'22; Council, Idaho.

Redinger, Clyde Arthur; ex-'21; Adams Basin, N. Y.

Rettig, Edwin Claire; B.S. For. '19; Clearwater Timber Protective Association, Orofino, Idaho.

Reuterskiold, France; (Voc.) '22-'23; Atkinson, Wisc.

Robinson, Ernest G.; (R.C.) '24; Clearwater National Forest, Orofino, Idaho.

Roeder, Charles; (R.C.) '20-'21; Streator, Ill.

Rodner, Jack Wallace; ex-'25; Office of White Pine Blister Rust Control, 618 Realty Bldg., Spokane, Wash.

Ruckweed, Fred John; B.S. For. '17; Gettysburg Public Schools, Gettysburg, S. D.

Rudesill, Ralph M.; (R.C.) '20-'22; Bradford, Pa.

Runberg, Victor; (Vov.) '22-'23; Hedlund Box and Lumber Co., Spokane, Wash.

Ryan, Cecil C.; B.S. For. '24; Moscow, Idaho.

Salvin, Otis Wm.; ex-'19; Carmen, Idaho.

Sams, Arch M.; ex-'26; Skamania, Wash.

Schofield, Wm. Robert; B.S. For. '16; Topographic Engineer, Hammond Lumber Co., Samoa, Cal.

Schultz, Jerry; (R.C.) '24; Chicago, Ill.

Shaner, Fred; (Voc.) '23; Ranger, Selway National Forest, Kooskia, Idaho.

Sharma, Parmeshwri Das; M.S. For. '22; Forest Expert, Department of Forestry, Gwalior State, Central India.

Slavens, Erwin Howard; ex-'20; Spokane, Wash.

Smith, Henry L.; ex-'14; U. S. Forest Service, McCall, Idaho.

Staples, Howard W.; B.S. For. '20; Yukon Gold Co., Murray, Idaho.

Stevens, Arthur W.; B.S. For. '15; Kearney, Nebraska, Editor "The Kearney Democrat."

Stillinger, Charles Roy; Special '19; U. S. Bureau of Plant Industry, Office of White Pine Blister Rust Control, Spokane, Wash.

Stone, Capt. Lawrence Fielding; ex-'15; Commanding Officer, Arcadia Balloon School, Arcadia, Cal.

Stoneman, J. Warren; ex-'24; Route 9, Hillyard, Wash.

Storms, Willard Sidney; ex-'23; Farmer, Rupert, Idaho.

Teed, Ryle; ex-'23; Forest Examiner, U. S. Forest Service, Portland, Oregon.

Telford, Milton M.; ex-'20; Twin Falls, Idaho.

Thornton, James A.; ex-'12; Logger, Coeur d'Alene, Idaho.

Vick, Ernest Raymond; (R.C.) '19-'20; U. S. Forest Service, Luther, Montana.

Wadsworth, Herbert A.; B.S. For. '11; Major, U. S. Infantry, Fort Howard, Maryland.

Wheaton, Rodgers G.; B.S. For. '24; M.F.

(Yale University) '25; U. S. Forest Service, Livingston, Mont.

White, Albert C.; (R.C.) '19-'20; R. F. D. No. 1, Boise, Idaho.

Williamson, Charles Leonard; ex-'14; N. W. Manager, Power Regulation Co., Chicago, Ill., 318 Alaska Bldg., Seattle, Wash.

Willey, Lewis Edwin; (Voc.) '22-'23; c/o J. J. Day, Moscow, Idaho.

Yates, Donald; B.S. For. '17; Land Department, Potlatch Lumber Co., Potlatch, Idaho.

Youngblood, Frank; (R.C.) '22-'23; Meridian, Idaho.

Zuver, John H., Jr.; ex-'25; 710 Rex Street, South Bend, Indiana.

WHY A STATE CONSERVATION POLICY IN IDAHO?

(Continued from page 4)

we reserve everything from 14 inches in diameter down to the smallest seedling. A green cover is left which reduces the fire hazard to a minimum and gives us the advantage of years and years of growth of timber, which under the method pursued up to that time would have been destroyed, leaving the land a black, desolate, barren waste. Under this method, nature will do the reforestation. No planting of trees with its enormous cost and loss of time will be necessary.

Many who have followed the old method of waste and destruction still contend that this slashing disposal requirement cannot be profitably met. Our answer is—we have enforced these requirements in all our sales for the past six years, and our stumpage is still in demand at a higher price each succeeding year. The same holds true with sales made by the U. S. Forest Service, which makes similar requirements.

There is no department of our State Government in which the entire people should take a deeper and more vital interest than in its State-owned land and timber. No selfish interests or false economists should be permitted to endanger the welfare of the State or waste its resources. We should use every legitimate means of protecting the magnificent gift bestowed upon the people of Idaho by a generous Nation.

POSSIBILITIES OF PULP AND PAPER INDUSTRY IN NORTH IDAHO

(Continued from page 6)

The Coeur d'Alene and St. Joe National Forests are both tributary to Coeur d'Alene Lake, both by rail shipments and by drivable streams flowing into the lake. The St. Joe Forest contains some excellent bodies of spruce, aggregating about 295 million feet, and a little over 100 million of white fir and hemlock. The Coeur d'Alene is estimated to carry forty million of spruce, 160 million of hemlock, and 480 million of white fir. The estimate on hemlock is probably low.

The Sandpoint region, including Bonner and Boundary Counties, is being more rapidly depleted of its privately owned timber than any other section of the State. A pulp mill in this section for a permanent supply would have to depend very largely on National Forest and State timber, although there would probably always be a considerable cut of second growth white fir and hemlock coming in from private lands after the virgin timber is exhausted, and Canadian spruce would be an important supply. The Kaniksu and Pend Oreille Forests, and perhaps the Kootenai Forest in Montana, might be considered tributary to this region. The Kaniksu Forest is estimated to carry eighty million feet of spruce, 180 million hemlock, and 140 million white fir, the Pend Oreille 200 million spruce, eighty million hemlock, and 125 million white fir, the Kootenai 760 million spruce, eighty-five million hemlock, and eighty-five million white fir, making a grand total of 1,040 million spruce, 345 million hemlock, and 350 million white fir. The amount of hemlock which would be eventually available is probably far greater than this, since there are vast bodies of very old stands of partially defective hemlock which have been given little weight in the estimates, and from which eventually large amounts could be culled for pulp wood. Both the Kootenai and Pend Oreille Forests bear some heavy stands of spruce, though the spruce type is usually located in the basins at the heads of streams, and consequently does not offer cheap logging.

Considering only the matter of a permanent supply of timber, there seems little doubt that North Idaho could maintain several paper mills. Under present conditions pulp wood could be obtained considerably cheaper than in most of the established paper manufacturing regions of the East. Department of

Agriculture Bulletin No. 1241 gives the average pulp wood prices in the United States, f. o. b. mill per cord, as follows:

1922	$16.20
1921	20.10
1920	15.95
1919	13.93

During the same period, in North Idaho white fir and hemlock logs could be purchased at prices ranging from $10 to $16 per M., or about $5 to $8 a cord.

Water power is, of course, readily available in Idaho, both developed and potential. Abundant deposits of local limestone exist.

Against these advantages there are several disadvantages which will tend to delay development of the industry. These are: 1. Restricted local market, 2. High freight charges to other markets, 3. Long freight haul on chemicals, 4. More expensive labor, 5. Pioneer conditions, 6. Heavy initial plant investments.

It is probable that these disadvantages will for some time offset the advantages, but they are all obstacles which will be gradually removed by westward movement of population, greater national demand for paper, and exhaustion of pulp wood supplies in the East. There is little doubt that the Inland Empire will eventually support a thriving paper industry, but how soon it will come about remains to be seen.

FIRE RESISTANCE OF NORTHERN ROCKY MOUNTAIN CONIFERS

(Continued from page 10)

the larch. Its foliage is always young and moist. Then, too, when the leaves of western larch have all been killed by the heat of a slash-disposal fire in May the trees have been observed to put forth a second foliage about a month later and some of the trees appeared after a year or two to recover fully from the effects of the fire. It is doubtful if this occurs with any other conifer in this region.

The tolerant trees are the ones which retain their leaves for long periods. These tolerant trees are without exception of low fire resistance. Doubtless the leaf characteristics are one of the reasons for the low fire resistance. Persistent lower branches often hanging close to the ground and clad with half dry, resinous leaves are a great aid to the start of crown fires. Such trees can be touched off during a dry time with a torch, or even with a match in the lower limbs and will become a gigantic flaming torch in an instant. Inflammability of foliage is an important factor in this but it is usually abetted by the presence of lichen growth.

A heavy growth of lichens, commonly called "moss" by woodsmen, is one of the features of the forests on the west slope of the Continental Divide in this region. In the vast lodgepole pine forests east of the Divide the larger lichens are wanting and the others are of scant importance from a fire standpoint. West of the Divide but three species of lichens can be said to contribute materially to the fire danger. All of these are of the type known as "fruticose," in reference to their branching or shrublike form. One of the three is a yellow-green lichen very common on the dead limbs and bark of yellow pine and Douglas fir trees but also found to some extent on other species. It is rarely more than one and one-half inches long and is not very important from a fire standpoint although it does serve as tinder to carry fire up a trunk or to help ignite dry limbs. It is sometimes called "wolf moss" and I believe is now known to botanists as **Letharia vulpina.**

Our two really important lichens are known as "black moss" or "squaw hair moss" and "green moss" or "gray moss." Botanically the black is **"Alectoria fremontii"** and the gray-green one is **"Alectoris sarmentosa".** They are common from the Flathead region in Montana through Idaho north of Salmon River. They have been found on all of our common conifers and on a few of the larger shrubs. The black one appears to prefer the more open forests, the upper, and consequently more exposed parts of the trees, and the higher altitudes, but the two overlap heavily in range and in many instances both have been observed growing in profusion on the same tree. Neither species becomes abundant enough or large enough to be important from a fire standpoint in stands less than fifty years old and they aid greatly in giving the overmature stand the characteristic appearance of "hoary old age". Not infrequently on old trees, the volume of these lichens appears to be greater than the volume of foliage. They hang in festoons and tassels from the trunk itself and from every branch and twig. Single plants of either lichen may be from four inches to a foot or more in length, with a myriad of slender branchlets.

A peculiarity of both of these lichens is that they are very highly inflammable. During dry weather they may be lighted instantly with a match whereupon they flame up quickly and burn with sufficient heat to ignite dead

twigs and resinous green foliage. The lichens themselves appear to bear a resinous green foliage. The lichens themselves appear to bear a resinous or oily principle which causes them to burn freely even in damp weather. Burning festoons may be carried by even a light breeze frem one tree to another. Thus these lichens form the light tinder which serves to ignite the heavier fuels and carry fire aloft in green tree crowns when they would not otherwise ignite. One must see their behavior in the presence of fire in order fully to appreciate their importance.

The present possibilities of practical application of this information are very limited. Under existing economic conditions and with very limited silvicultural experience and skill with these species, it seems rather improbable that the forester can do much to favor fire-resistant species or will desire to do so. Perhaps it may prove better business to eliminate the fires. Neither western larch nor Douglas fir are held in high esteem in this region at this time. It is conceivable that they may be regarded much more highly in the future. Their relative safety from fire is a point in their favor that may well be weighed with other things. The possibility of artificially extending the range of the really highly desirable and fire-resistant western yellow pine to better sites and consequent more rapid increment has been but little, if at all considered. Foresters and lumbermen in North Idaho are now in a white pine era. If the blister rust arrives, and if conflagrations continue to take such heavy toll of white pine, then they must in the near future turn attention to other species.

Table Showing the Relative Fire Resistance of the More Silviculturally Important Northern Rocky Mountain Conifers

Species	Thickness of bark old trees	Root Habit	Resin in old bark	Tolerence Branch Habit	Tolerence Stand Habit	Relative Inflammability of Foliage	Lichen Growth	Degree of Fire Resistance
Larix occidentalis	Very thick	Deep	Very little	High and very open	Open	Low	Medium heavy	Most resistant
Pinus ponderosa	Very thick	Deep	Abundant	Moderately high and open	Open	Medium	Medium to light	Very resistant
Pseudotsuga taxifolia	Very thick	Deep	Moderate	Moderately low and dense	Moderate to dense	High	Heavy to Medium	Very resistant
Abies grandis	Thick	Shallow	Very little	Low and dense	Dense	High	Heavy	Medium
Pinus contorta	Very thin	Deep	Abundant	Moderately high and open	Open	Medium	Light	Medium
Pinus monticola	Medium	Medium	Abundant	High and dense	Dense	Medium	Heavy	Medium
Thuya plicata	Thin	Shallow	Very little	Moderately low and dense	Dense	High	Heavy	Medium
Picea engelmanni	Thin	Shallow	Moderate	Low dense	Dense	Medium	Heavy	Low
Tsuga mertensiana	Medium	Medium	Very little	Low dense	Dense	High	Medium to heavy	Low
Tsuga heterophylla	Medium	Shallow	Very little	Low dense	Dense	High	Heavy	Low
Abies lasiocarpa	Very thin	Shallow	Moderate	Very low dense	Moderate to dense	High	Medium to heavy	Very low

From the ecological and floristic points of view a study of the fire resistance of the various species will yield considerable information in regard to the relations and distribution of Northern Rocky Mountain tree species. To the ecologist, rather than the forester, perhaps will this subject offer an interesting search for something more accurate than empirical information.

In summarizing it may be said that:

1. There is a great difference in degree of fire resistance between the species in which there is combined the greatest number of fire-resistant qualities and the species in which the fewest of those qualities are inherent.

2. There can be little doubt that western larch belongs at the top of a list made up in order of greatest fire resistance and alpine fir at the bottom.

3. Many of the trees between the bottom and top of the list are assigned their relative positions arbitrarily and may be moved when research has yielded added information.

4. The table lists the common commercial conifers in their order of apparent fire resistance and indicates the factors on which the order is based.

5. Present possibilities of practical application of information in regard to fire resistance of tree species appear very limited. The subject appears to be of considerable ecological significance.

PROFESSIONAL ETHICS AS APPLIED TO FORESTERS

(Continued from page 12)

What is a profession anyway? If a man is practicing medicine does he belong to the medical profession? or if he is in charge of a tract of forest land and is engaged in growing trees on it, does he belong to the profession of forestry? Rather basic questions—the latter at least has agitated the Society of American Foresters from the day of its origin.

How does this definition sound? "A profession is a body of men who carry on their work in accordance with rules designed to enforce certain standards both for the better protection of its members and for the better service of the public. Its essence is that it assumes certain responsibilities for the competence of its members, and that it deliberately prohibits certain kinds of conduct on the ground that though they may be profitable to the individual, they are calculated to bring into disrepute the organization to which he belongs.

"The conception implied in the words 'unprofessional conduct' is therefore the exact opposite of the theory and practice which assumes that the service of the public is best secured by the unrestricted pursuit on the part of rival traders of their pecuniary self interest within such limits as the law allows. The object of the rules is clear. It is to impose on the profession itself the obligation of maintaining the quality of service and to prevent the common purpose being frustrated through the undue influence of the motive of pecuniary gain upon the necessities or cupidity of the individual." (2)

Notice the two planks in this platform. "It assumes certain responsibilities for the competence of its members." If forestry is as foresters believe, a profession requiring fully as broad and as thorough preparation as medicine, law or engineering, can foresters afford to waive this preparation, and admit to the profession large numbers of men whose training is wholly empirical? If so, they are doing something which no other organized profession has ever dared to do, for by this course, the profession assumes full responsibility for the quality of the Service rendered, and the influence exacted by these empiricists.

"It deliberately prohibits certain kinds of conduct calculated to bring into disrepute the organization to which he belongs."

Apparently, the formulated code, like the two tablets of stone (!), has a place in moulding a profession into shape. But, quoting from Heermance: "A code is designed to serve an immediate practical purpose. It is not a statement of general morality. It deals with the customs and ideals, the short-comings and the duties of a particular group of men. Ethical principles are stated in terms of daily experience. The code which falls short of this or attempts to go beyond is likely to become a series of platitudes."

If foresters are ever going to formulate a written code of professional ethics apart from the present generally accepted and unwritten code which has served the profession so admirably thus far, it will have to be the growth of discussion and experience based on the following tenets. 1. Are the acts in question capable of definition and detection? 2. Are these acts definitely harmful to other members of the profession? 3. Are they injurious to the welfare of the public? 4. Do they tend to impair

(2) Tawney, R. H., The Acquisitive Society. (Harcourt, Brace and Howe, 1920.)

the confidence of the public in the profession?

Since selfishness is at the bottom of every unethical act, and since the primary motive of the individual is personal gain, it follows that back of every unethical practice we find a distortion of the healthy principle of personal profit, into a form where this gain is sought in ways which violate one or more of the above rules. To be sure, a man's job may be imperilled in some instances unless he condones unethical practices on the part of his employer, but when it comes to a showdown, why should he think that he must literally sell his soul to the devil and actively sponsor these practices himself in order to earn a living in his profession. Better in this case make the choice between the profession and the living, and if the emoluments are not to be had professionally, seek them in some other field and retain one's self respect.

Foresters in private employ are not expected to bring about a millenium in private industry in a fortnight after they strike the job—but on the other hand they need not become tools and mouthpieces for the thwarting of public measures and the retarding of the progress of forestry. Nor is the forester employed in state or national service expected to remove by his own effort all the abuses, real or imagined, that may infest these organizations or render his superiors unfit to hold their jobs. Primarily, it is himself and his own attitude that needs his most serious attention. Occasionally it may be necessary to blow off the lid, or to seek a new job, but these crises do not occur as often as the inexperienced forester may imagine, and patience, forbearance and thorough insight into facts will often work miracles. The points formulated for discussion by the Committee on Ethics of the Society of American Foresters(3) show a grasp of some of these principles as well as indicating the difficulty of bringing them down to earth in a form capable of disciplinary action. Machinery for each action exists, but in only one instance has a member ever been disciplined. Bringing a case before the Executive Council means that some forester must prefer charges against a member of his own profession. These charges may not warrant expulsion, and the Council is empowered merely to reprimand the offender. But even this measure implies the submission of proof of the charge and this proof must be documentary or established by witnesses with as much care as if it were a case in court. When coupled with these conditions, we consider that the case is seldom of a nature resembling the commission of a crime, hence not only must the facts be proved but the motive established, or, in effect, a direct attack must be made on the professional honesty of the accused, in making the charge, when in every case involving motive he will be given full benefit of the doubt, the difficulty of actually resorting to such charges is obvious. If, to this, we add the fact that the member making the charges does not act anonymously but assumes the onus of the attack and the resultant hostility of the accused and his friends, and that he has no part in preparing the case or even in presenting it, not being empowered to collect evidence, which must be handled by the member in charge of admissions, there is not one chance in a hundred that a forester would be moved to act in such a case even for the benefit of the profession, or once having done so, that he would ever try it again.

In fact, the rule of professional courtesy which in its distorted form causes physicians to condone or conceal inefficiency of brother physicians, and members of other professions to seek to suppress all criticism of their profession, which spirit caused Bernard Shaw to make his caustic epigram "All professions are a conspiracy against the laity," this spirit might easily cause the accuser to be regarded as the more unworthy of the two.

Yet the report of this Committee urges the bringing of cases and their frank and open discussion as the very means by which the atmosphere is to be cleared and the standards crystallized. So we find ourselves in the usual dilemma, that when faced with the grapple of living forces we must wade in and get bruised if we ever expect to accomplish anything. There is nothing theoretical about a concrete case. Fortunately, it doesn't take many cases to clarify principles.

But in what way is the Society or the profession to benefit by bringing cases? Is the discussion of a man's professional honor to be spread broadcast in the magazine, if he is cleared of a charge? Or are the juicy facts to be printed if he is knocked out of the Society? If he is slapped on the wrist and told never to do it again are his professional brothers to be informed of the reasons for the admonition? Or is the soft pedal to be put on all cases, and the tongs used quietly to remove them at night?

The plain facts are that business men in

(3) Journal of Forestry, October, 1924. Page 89.

their associations have more courage in dealing with facts than have the members of a profession, and that written codes of business ethics are far easier to formulate the unwritten code of service and honor, and shrink from the raw contact with cases involving discipline. Personally, I believe that further efforts should be made to formulate a written code.

But certainly a change is needed in the present mechanism for preferring charges for no honorable man desires to make them anonymously and to make them as an individual, with no opportunity to follow them up, merely makes him a goat. Furthermore, no one man's judgment should be considered infallible. Personal animosity is generally suspected in such a case, and in a certain per cent of cases may exist. On the other hand, if at least three members were required to sign the charges the matter is at once relieved of this animus, and placed on a better basis. If the accuser cannot persuade even two other members of the validity of his case, or cannot find even that number who consider it worth investigating or who have the courage to demand such action, then there is no reason why he in turn should rush in. My one concrete suggestion is therefore that the Society of American Foresters would do well to amend its constitution to provide for this procedure in the future.

PRODUCTS FROM IMMATURE WHITE PINE STANDS IN IDAHO

(Continued from page 16)

trees as might safely and profitably be cut at the age of 60 years. Three hundred well formed and rapidly growing trees would be a good number to leave per acre when the stand is 60 years old. Ordinarily another thinning should be made when the stand becomes 80 years old. The final saw timber crop might be removed when the forest becomes 100 years old.

SOME METHODS USED IN GRAZING STUDIES

(Continued from page 20)

study of the application of deferred and rotation grazing, a number of plots are established and grazing is excluded until time of seed maturity. One plot deferred for one year, another for two years and another for three years, for example, will indicate the number of years that deferred grazing should be applied to improve the range. Other similar modifications may be tested with the use of the hurdle plot.

An enclosure commonly used for the hurdles is shown in Fig. 2. It consists of four panels; each panel being an open framework four feet high and 16 or 18 feet long, made of 1x4 inch and 2x4 inch lumber with woven wire nailed to the framework. When wired together at the corners, these panels form a very substantial enclosure. If made of light, durable lumber and woven wire, the panels will not cause climatic conditions to be changed on the plot sufficiently to interfere with plant growth, and the panels are convenient to move.

Number of Sample Plots and Selection of Site

The number of sample plots selected and their location depends upon the intensity of the study and the variety of conditions represented. Obtaining representative conditions is a prime consideration in the selection of the location. If circumstances limit the number, the plot or plots should be located upon the most representative plant type of the range unit under consideration. If a more intensive study is made, the types upon which the plots are to be located should be chosen in accordance with their relative importance on the range area involved. The same method should be followed in deciding upon the grazing conditions to be studied within each type. If the number of plots are limited, the most representative grazing conditions should be determined as the site for the plot. It would be unwise to select the more heavily grazed or the more lightly grazed portions of the type for the plot and attempt to apply the results for all conditions. On the other hand, if a more intensive study is planned, as many conditions as are prominent on the unit and the scope of the study will permit should be included. Studies of a specific condition, of course, would require that plots be located accordingly. As many protected plots should be established as are needed to check the conditions covered by the open plots.

All sample plots should be established, in sofar as possible, to avoid undue disturbance by local non-representative conditions. Ordinarily, a plot should be placed not closer than several hundred feet away from stock driveways, trails, roads, fences, watering and salting places, bed grounds, round-up grounds, etc. Judgment should be exercised

in so far as possible to avoid placing the plot or plots where any of these factors may enter in at a future date. Otherwise, valuable records and much effort may be wasted.

Size of Plots

Plots may vary in size from a few square feet or a portion of a square meter up to an acre or more, depending upon their purpose and the detail with which the data is obtained. Plots from a square meter, or thereabouts, up to 33 feet square are best adapted for most grazing studies. The smaller plots are used with the more accurate methods of obtaining and recording the data. It is seldom a good plan, however, to use a plot under a square meter because of the difficulty of obtaining representative conditions and avoiding error with such a small area. In many instances, two or more sizes of sample plots may be used in conjunction. In fact, this is very often desirable. For example, a major plot may be established for obtaining more general data, and a smaller plot located within the larger one, upon which detailed study is made.

Fig. 2—Hurdle Enclosure. Enclosures of this nature are equipped with removable panel fences. Sample plots provided with these enclosures are of value for studying modifications in the time and degree of grazing.

Marking Sample Plots

It hardly seems necessary to mention the need for marking all plots permanently and "tying them in" to some permanent object. Yet these are matters very frequently overlooked which have led to the loss of valuable data. The practice should be to mark all the corners of each plot with a stake of some non-destructive material. Metal stakes or pins are best suited for this purpose. Wooden stakes may decay, be broken off by livestock, or be destroyed by rodents within a comparatively short time after placement. A very serviceable stake consists of a right angle "angle iron" one inch wide on the sides, made of one-eighth inch material, ten inches in length, sharpened or left blunt on the end. These stakes should be carefully inserted at the corners of the plot and driven down to within one or one and a half inches of the ground, so as to be disturbed as little as possible by grazing animals and to defy detection by any curious person who might disturb them. Where re-location of the plot may be difficult, a guide stake 2½ feet long, made of the same material, should be inserted and driven 1½ feet into the ground at a measured distance and bearing from the plot. Identification marks should be stamped on the metal stakes with the use of steel dies, or a small aluminum tag about the size of a 25 cent piece with appropriate marks should be securely wired to one of the stakes near the surface of the ground. Painting the metal stakes with red lead-oxide paint, which prevents rusting and

preserves the identification marks, is desirable but not necessary. Round iron pegs one half inch in diameter may be substituted for the angle iron corner stakes, and ordinary gas pipe ¾ to 1¼ inches in diameter may be used for the guide stakes. The round iron pegs, however, are more difficult to stamp than those with a flat surface. The use of these indestructible stakes assures greater permanency of the sample plot.

When plots are situated on the open range, their re-location at a later date may be difficult unless their location is described with reference to some permanent point that may be found easily. It is a good plan, therefore, to "tie in" each plot by measuring and recording its distance and bearing to some such an object. Section corners, fence corners, springs, buildings, forks of a road or some other easily discernible object should be used for this purpose.

Methods of Recording Sample Plot Data

There are a number of ways of obtaining and recording the data, and sample plots are classified according to the method used. The basis for all of the methods is the **quadrat,** which, as the name implies, is a small square. This square is marked out upon the ground and a study is made of the vegetation within its boundaries. Investigators ordinarily find it convenient to use the meter as the unit of measuring quadrats because of the convenience with which it may be subdivided, although feet and inches may be used if desired. The various kinds of plots are (1) chart quadrat, (2) list quadrat, (3) combination list and chart quadrat, (4) tuft-diameter plot, (5) denuded quadrat and (6) major plots or quadrats.

The Chart or Map Quadrat

The chart quadrat is the most reliable method of showing complete detail. A map or chart is made of each quadrat established, showing each plant on the plot in its relative position and the area it occupies on the ground. Chart quadrats may vary in area, but the size most frequently used is a square meter. This has been found to be the best from the standpoint of including representative conditions, as well as that of time required for the work.

Mapping Quadrats: The equipment needed for mapping quadrats includes specially prepared tapes, map forms, pencil, scale, etc. Recently the pantograph, which is discussed on the following pages, has been perfected for charting quadrats, which speeds up and adds to the accuracy of the work. The tapes consist of two guide straps or tapes and four metal or leather boundary straps, about one-half inch wide and slightly more than a meter in length, perforated at 10 centimeter intervals and near the ends so that when pinned down at the ends in the form of a square, encloses an area exactly one meter square.

In establishing a quadrat, after the site has been chosen, the straps are first placed in position and fastened down with ordinary surveyor's pins, great care being exercised to have the straps conform to a true square. This may be accomplished by having the diagonals equal. The corner stakes should be driven while the straps are in place and on the inside of the quadrat. The general practice has been to place the corner stakes at the outside intersection of the boundary straps, which makes difficult the use of a quadrat strap with a width different than the original. Placing the stakes on the inside of the corners makes possible the use of straps of a different width at a subsequent mapping. When subsequent mappings are made, the quadrat straps may be located with reference to the corner stakes.

Fig. 3 shows a suitable type of form for quadrat mapping. This is merely an outline of the quadrat reduced to a scale of about one to five, showing the lines corresponding to the centimeter divisions on the quadrat and with the decimeter lines accentuated. Some investigators prefer a map form showing only the decimeter lines. The centimeter lines, however, are very useful in facilitating correct location of plants on the map and in compiling the data. Where a special form is not available, ordinary coordinate paper of adequate size serves very well.

In mapping, the individual plants are shown on the map form in the position corresponding to their location on the ground. Appropriate symbols are used for each species. Plants occupying less than a square decimeter are mapped as individual plants, merely inserting the symbol or a dot in addition to the symbol on the map, corresponding with the location of the plant on the ground. Clump-forming or tufted plants, i. e. plants occupying more than a square decimeter may be shown best by mapping the outline of the boundary line of the clump or tuft. In order to eliminate confusion in the case of plants which spread over the ground, the boundary of each tuft or clump should be mapped at

Fig. 3

PROJECT Natural Revegetation

QUADRAT NO C-3

RANGE UNIT Cove

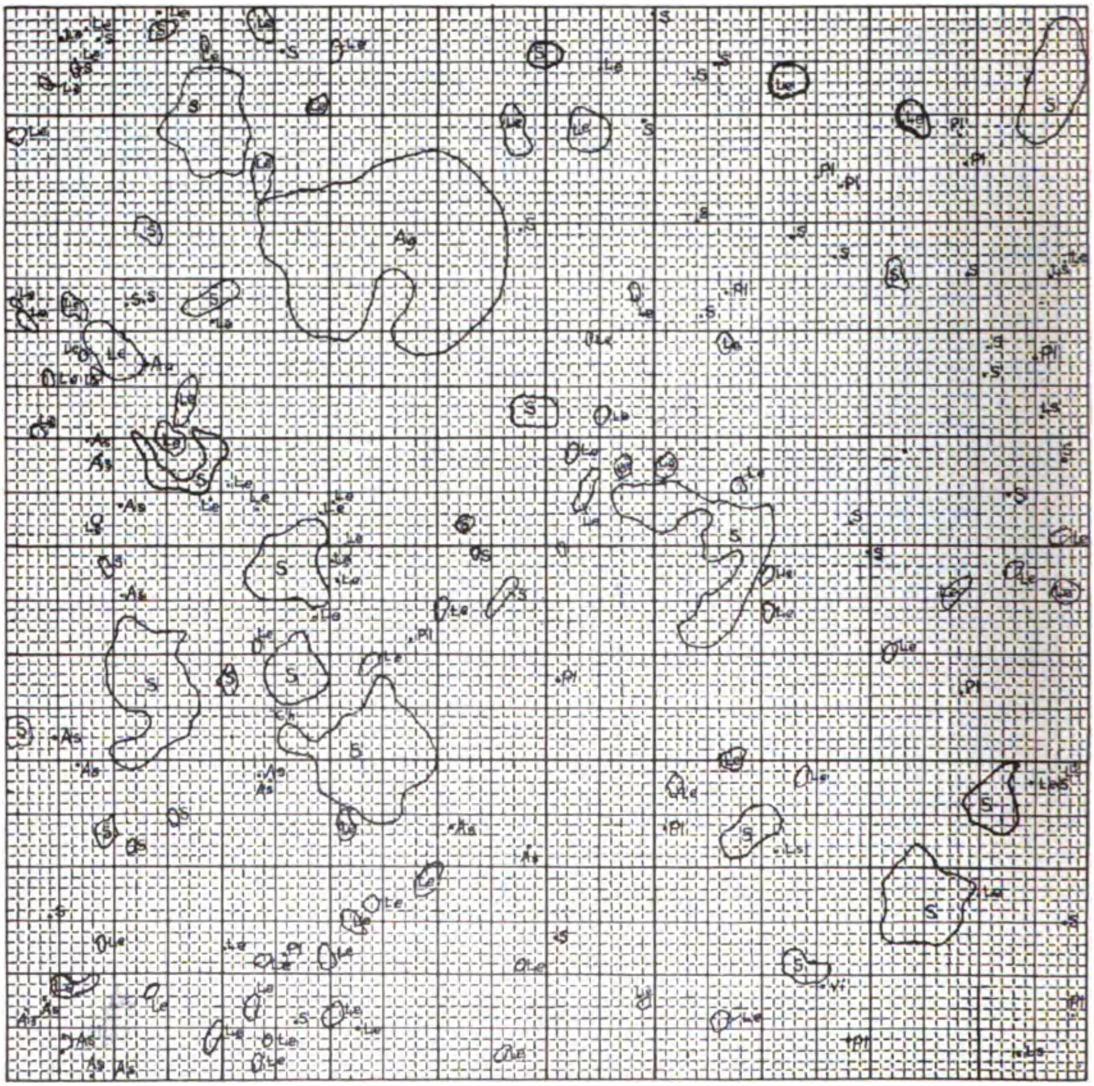
Established July 12, 1923

T. 18 S R 4 E Sec. 28

Dates of previous mapping

Date July 12, 1923

Mapped by H.E.M. and C.W.W.



LEGEND

S : Stipa lettermanii
Ag: Agropyron violaceum
Le: Leontodon taraxacum
Vi: Vicia americana
Ls: Lesquerella kingii
PL: Polygonum aviculare
As: Aster
Ch: Chenopodium album
Aa: Agoseris pumila

some standard height such as one inch above the ground.

Plants which spread by means of rootstocks present a somewhat different problem in mapping than do bunch-habit species, included among which are such species as **Pentstemon rydbergii, Achillea lanulosa, Agropyron dasystachyum and Agropyron smithii.** These plants may form large tufts within which there is incomplete cover. It is rarely practical to attempt to show each individual stem arising within these turfs; yet to show only the outline of the turf does not represent true density conditions and frequently other plants occur within them. A much truer representation of conditions may be had by mapping the boundary of the turf and estimating the density in terms of tenths of complete cover for each turf and entering this figure with the symbol for the species on the map. This then can be taken into consideration in summarizing the data.

In free-hand mapping, it is usually most convenient to start at one side of the quadrat, with the aid of the two guide straps lay off a strip one decimeter wide and one meter long, map the location of the individual plants and the outlines of the boundary of clump-forming and tufted plants on the first strip, and so on for each successive strip.

The Chartograph: Free-hand charting of quadrats, especially the more densely populated ones, is more or less a tedious and time consuming operation, which has limited their use to some extent. This objection is almost wholly eliminated by the use of a special instrument designed by Hill (8). This instrument is referred to as the "chartograph," and out of acknowledgement to the person who designed it may be termed the "Hill Chartograph." It applies the principle of the ordinary pantograph as shown in Fig. 4. Not only does it speed up the work, but eliminates mechanical and individual error. This instrument, with several refinements added, has been used extensively and with great success at the Great Basin Range Experiment Station. It has been found that two men are able to map four to five times as many quadrats in a day with the aid of this device as they were able to do working individually with the free-hand method. Not only was less time required and the work made less tedious, but it was more accurate and only one of the men needed

Fig. 4. Mapping a Quadrat with the Hill Chartograph. This device which adapts the use of the ordinary Pantograph to quadrat work, greatly speeds up, adds to the accuracy and removes much of the tedium in quadrat mapping.

to be familiar with the flora and skilled in charting work. The use of the chartograph has greatly broadened the use of the chart quadrat.

The List Quadrat

The list quadrat gives only the census of the vegetation on a quadrat. In listing, the quadrat is subdivided into units of convenient size and the census data is compiled for these units. Such records are of little value in grazing study work, except where the vegetation is made up of species, the individual plants of which occupy less than a square centimeter in area, such as annuals and non-clump forming perennials. This method does not take into account the area occupied by tufts or clumps or the density of the vegetation. In the case of grasses, for example, some species may form tufts several inches in diameter, yet under the list method they would be given no more consideration than an equal number of seedlings of the same species. Moreover, in a subsequent examination the larger clumps might be broken into several smaller clumps by overgrazing. The list data would show an increase in number of plants, whereas detterioration actually may have taken place. Obviously, such a method leaves much to be desired in the way of showing change in forage cover.

The list method serves a useful purpose however, for quadrats having certain classes of vegetation. The actual location of annual and single stemmed perennial plants on the quadrat map is usually of minor importance, and all essential features are shown by listing the number of plants of such species. The list quadrat, therefore, may be used to advantage on quadrats where there are no tufted plants.

The Combination List-Chart Quadrat

The listing of other than clump or tuft forming plants has led to a combination of the list and chart quadrats in grazing studies. On areas where both tufted or clump forming species and individual stem specimens occur, all of the essential information may be shown by mapping the tufted species and listing the individual stemmed plants within each square decimeter or other convenient unit of area. For example, on a quadrat occupied by **Stipa minor, Trisetum spicatum, Agropyron violaceum, Delphinium barbeyi, Polygonum aviculare, Collomia linearis and Sophia incisa** the first four specimens would be mapped and the last three listed. This simplifies and speeds up the work and at the same time obtains all of the data needed.

Tuft-diameter Quadrat

Another modification of the list or chart plot, known as the **tuft-diameter quadrat,** has been developed for certain purposes where refined detail is not essential. It takes into account the area occupied by plants which form tufts or clumps. This system is a generalized short cut wherein the areas are determined on the ground instead of from the map as in the case of the chart quadrat. While it is not as accurate as the chart method it may be used where complete detail is not necessary or impractical. It is especially adapted for quadrats over a square meter in size.

The tuft-diameter method of recording quadrat data involves (1) listing the number of tufted species according to diameter, or (2) showing the approximate location of the tuft forming plants with a circle within which the diameter of the tuft is recorded. Under the first method, the diameter class ranges of the plant tufts to best suit the nature of the vegetation on the quadrat, such as O-2cm., 2-4cm., 4-6cm., or 0-2 ins., 2-4ins, 4-6 ins., etc, are first decided upon. The diameter of tufted plants in each subdivision of the quadrat is measured and listed in its appropriate diameter class. All the non-tufted plants are listed in the usual manner. In the second method a circle is used to represent the approximate location of the plant on the quadrat, the diameter of the tuft is measured and this figure is entered within the circle. .The average of two diameter measurements of each tuft taken at right angles to each other is usually sufficient to determine the diameter of a tuft. With these data as a basis, it is possible to arrive at a fair approximation of the area occupied by each species on the plot.

The Denuded Quadrat

Some investigators have used the depopulated quadrat to determine rate of improvement of range following denudation. The process consisted of establishing and charting a quadrat and then artificially removing the plants upon it, after which reoccupation of the area by vegetation is watched. This method is unreliable and of little value in grazing studies. In the first place, a wholly different soil condition results from artificial denudation as compared to denudation by overgrazing. Secondly, the quadrat would be reseeded quickly from the nearby vegetation, a condition which is not so favorable under denudation by overgrazing. The only reliable

method of determining the rate of improvement of denuded range is to select sample plots on areas where the vegetation has been badly depleted or denuded by overgrazing.

Major Quadrats

Sample plots larger than a square meter up to several square rods in area are ordinarily called major plots or major quadrats. Two very convenient sizes to use are plots one or two rods on a side, or the approximate equivalent in meters. Major plots are used to obtain data in less detail, but for larger areas than the meter quadrat. Hence major quadrats are seldom mapped, but some other method of obtaining and recording the data is used. The best plan is to use a major plot for obtaining the more general data and a chart or combination chart-list quadrat within the major plot to show the detail.

A method frequently used for obtaining the data on major quadrats is as follows: The entire plot is divided into convenient subdivisions. The density or the percentage of the ground occupied by vegetation for each subdivision is carefully estimated by eye, the plant species on each subdivision are listed and a careful estimate made of the percentage that each species makes up of the total vegetation on that subdivision. Summation of the species, percentage of each and density for each subdivision will give the composition, density and percentage that each species makes up for the vegetation on the plot as a whole. Although this system introduces the element of estimating, which is objectionable from the standpoint of careful work, it has been found that experienced investigators are able to obtain highly reliable results. The larger area involved and the greater number of plots which may be recorded in a given period as compared to the smaller chart quadrat offsets much of the error.

Another advantage of the density and percentage of species estimate is found when converting quadrat data into terms of carrying capacity, since it involves the same principles used in making forage estimates. Forage estimates take into account the density, composition and palatability of the vegetation. **Density x palatability** gives the **forage acre factor. Forage acre factor x surface acres** of the type or range area involved gives the number of forage acres, and knowing the forage acre requirement per animal per month as determined from carrying capacity tests it is largely a matter of mathematics to determine the number of animals a range unit will support. Hence the density and percentage of species estimated on the sample plot, together with a knowledge of the palatability percentage of each species, makes it possible to compute the carrying capacity and subsequent changes directly from the sample plot data. When a major plot, in connection with a chart quadrat, conversion of the chart quadrat data into terms of carrying capacity is facilitated and made more reliable.

Where a more precise method is desired, and if the plot is not too large, the tuft diameter method of charting or listing may be used.

Season and Frequency of Mapping

Maps or other records of plots should be made at the time of year when the vegetation is near its maximum development and prior to a time when grazing or drying up of the plants will render their identification or detection difficult or impossible. This is usually from a month to six weeks after the growing season begins. On many sites annuals and some of the early perennials may dry up before the later perennial vegetation has reached the height of its growth. Where both earlier and later maturing species occur on the same quadrat, charting should be done, if possible, at a time when both kinds of vegetation can be identified. If the period of development of the two are too widely separated to map both at one time, an early and a late charting becomes necessary. In localities where there are two distinct rainy periods and consequently two growing seasons, as in parts of the southwestern United States, it is usually necessary to map once and somemes twice in each growing season.

Frequency of mapping depends upon climatic conditions and the purpose of the study. The most detailed record would be obtained if the plots were mapped each year or as many times in each year as is necessary to obtain a complete record of the seasonal phases of vegetation. Such great frequency, however, is not essential to show the trend of the vegetation and very often is not practical because of the amount of time required. Under average conditions it takes about three years for the vegetation to show any response to a method of grazing. Hence, mapping quadrats every three years would be often enough for all practical purposes under average climatic conditions. Growing conditions, however, are subject to variation because of fluctuation in climatic conditions. In the Southwest, for example, where rainfall is normally low and

ASSOCIATED FORESTER, 1924-25

erratic, the vegetation may vary in some years as much as 50 per cent or more above or below average. Where such variations occur, it is necessary to map the quadrats to determine the effect of the climatic fluctuations. A safe rule, therefore, is to map quadrats at three year intervals with sufficient intermediate mapping to take into account variations in density and composition of the vegetation due to fluctuations in climatic conditions.

Quadrats for special purposes may be mapped at greater or less intervals than three years. Where a method of grazing is being tried out, each method should be continued for not less than three years and as many more years as is necessary to obtain conclusive results. In such cases the quadrats should be mapped at the beginning of the study, again in the third year thereafter, with additional chartings during or immediately after abnormal seasons, and then every two or three years until the study is completed.

Photographs

Photographs are highly valuable for showing general conditions on quadrats. Wherever possible, therefore, a photograph should be taken each time a quadrat is mapped. The location of the camera when the first photograph is taken should be marked with a stake so that each subsequent exposure may be made from the same angle and distance. This will facilitate comparison of one photograph with another.

Other Data

As complete a history as possible of conditions attending the plot should be made in addition to mapping or listing the vegetation on a sample plot or quadrat. The record made at the time that a plot is established should go as far into past history as possible. On subsequent examinations only the incidents that have occurred since the last examination need be recorded. The back of the quadrat map is a convenient place to record this information. The points to be covered and a method of recording the information are shown in Fig. 3.

Compilation of Quadrat Data

The procedure in compiling quadrat data varies with the method of recording the data, object of the study and the preference of the individual doing the work; hence it is difficult to describe the methods in much detail. The summarization of the data on the chart quadrat, however, is practically the same in all cases. The number of individual specimens for each non-tufted species on the quadrat are counted and totaled. The area occupied by each tufted specimen is determined with a planimeter or when the finely divided map paper is used by counting the number of centimeter squares within the boundary line of each tuft. The most convenient method is to planimeter the larger tufts and count the square centimeters for the smaller tufts. These figures are then summarized for the whole quadrat to show the number of specimens of each for the non-tufted species and the number of specimens for each tufted species and the total area occupied by each species. These data are then compared with similar data for previous mappings and the increase or decrease in number of species, number of specimens and area occupied by tufted species is shown in terms of percentages.

Figure 5—Form for Back of Quadrat Sheet

Specific Object of Quadrat..

....Size of Quadrat ....

Location ....

Character of Site: Elevation.......................... Exposure............................ Slope......................

Soil ....

(Origin, depth, texture, humus, moisture holding capacity, etc.)

Plant Type ....Density of vegetative cover (in tenths).................

Principal species and percentage of each..

....

....

....

....

....

History of Range Use: Past: ....

(Cut over, burned over, class of stock, character of

....

grazing, period of use, etc.)

.... Present: ....
(Class of stock, periods of use, degree of grazing,

....
system of handling stock, deferred and rotation grazing, etc.)
Growing Conditions: This year: ....
(above, below or average)
.... During years since last charting ....

....

Vigor and life history of principal species:
Period of growth ....
Heigh, growth and luxuriance when mapped ....
Time of flower stalk production ....
Time of seed maturity ....
Size of seed crop ....
Remarks ....

....

SUMMARY OF QUADRAT DATA

Symbol																
Value for forage*																
No. specimens																
Area occupied																

		Last Mapping	This Mapping	Increase or Decrease
Total	(1) Number of species			
	(2) No. good forage species			
	(3) No. medium forage species			
	(4) No. poor forage species			
	(5) Number of specimens			
	(6) No. good forage specimens			
	(7) No. medium forage specimens			
	(8) No. poor forage specimens			
	(9) Area occupied			
	(10) Area occupied by good forage species			
	(11) Area occupied by medium forage species			
	(12) Area occupied by poor forage species			

*(G) good forage; (M) medium forage; (P) poor forage.

The writer has used a system of tabulating grazing studies quadrat data for a number of years which readily shows what the change in plant cover or succession is, that has been found very satisfactory. This method takes into account the forage value and life period of each species. The system of classifying the species and tabulating those data is shown in Figure 6.

Fig. 6—Tabulation of Quadrat Data by Years
Quadrat No.................

	Good Forage Plants						Mdm. Forage Plants						Poor Forage Plants					
	Perennials			Annuals			Perennials			Annuals			Perennials			Annuals		
Species Symbol																		
Year	1	1	1	2	2	2	1	1	1	2	2	2	1	1	1	2	2	2

(1) Area in square centimeters or (2) number of specimens.

By using the same vertical column for each species each year or time of charting, this form shows at a glance the coming in of new species or disappearance of former species, forage value and life period of each, as well as the change in number of specimens or area occupied by each. A sufficient number of vertical columns should be provided under each subdivision to show all the species that may be had or may come in during the period covered by five chartings. This form of tabulation may be adapted to show any other classification of the vegetation that may be desired.

Determining Other Factors of the Habitat

Where more intensive studies are being carried out, it is essential for the investigator to take into account the other factors which affect plant growth. The more important factors with which the grazing student is concerned include precipitation, air temperature, soil temperature, soil moisture, evaporation, transpiration, insolation, nutritive properties of the soil and biotic factors. Humidity of the air and wind velocity are secondary factors which are integrated in so far as study of the habitat is concerned in the evaporation and transpiration factors. Methods of measuring these factors have been described by Clements (9), Bates (10) and others. The study and determination of the part that each of these factors play in plant growth and forage production are ordinarily undertaken only at experiment stations or other similar places where intensive studies of long duration are carried on.

As has already been pointed out, except for the grazing factor the grazing student is most concerned with the part fluctuation in climate plays in forage production. This may be determined empirically by phenological records beginning with the inception of growth and continued until the close of the growing season together with measuring the forage production near the end of the growing season on a number of sample plots. Where necessary equipment is available it is desirable, of course, to measure the climatic factors, including precipitation, air temperature, soil temperature, soil moisture and evaporation.

The permanent sample plot is the basis of the forage production study and they should be selected and marked in the same manner as for other sample plots. An area about 16-½ feet square is the most convenient size for each plot. Observations on the plot should begin with the inception of growth in the spring and be continued at suitable intervals until

the end of the growing season. The information collected for each important species should be sufficient to show (1) inception of growth; (2) date when ready for grazing; (3) period of flower stalk production; (4) period of blooming; (5) period of ripening of seed; (6) period of seed dissemination; (7) time when seed has all been disseminated and (8) cessation of growth; (9) average length of leaves, average length of flower stalks and total number of flower stalks and flowers produced; and (10) remarks to indicate injury from rodents, disease or other biotic factors. Shortly after the time of seed maturity and before seed dissemination the vegetation on one-half of the area is harvested, dried and the air dry weight determined. Cutting of the vegetation at harvest time should be made at a standard height for all plots and at a height which will not affect the natural development of the plants in subsequent years. Two inches above the ground is satisfactory for most species.

Records over a period of years, showing the variation in the development of the vegetation and yield for each year will show (1) the variation in forage production from year to year, (2) the variation in the time of vegetational readiness*, (3) the time of seed maturity of the important forage species and the variation in the time of seed maturity. This information will serve as a basis for making adjustments in the numbers and handling of livestock and in the time of opening the grazing season that may be necessary to meet years below the average and as a foundation for the application of deferred and rotation grazing.

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1—The stage of development that a plant should reach in the early part of the growing season before grazing begins.

TO THE WIFE

(A Tho't on the Home Trail)

Now when I think of little things,
  Of flower, whim or stone
That turned my feet o'er unmarked ground
  Where wandered I alone—

Now that I know how long the way,
  How wonder, dark the night,
How many chances to be wrong
  When but one way is right—

And when I think of little things
  That may have led your feet
O'er virgin ways, I wonder, dear,
  If we but chanced to meet.

Stanley Foss Bartlett (R. C.) '21-'22.

IDAHO FORESTRY BULLETIN FILLS LONG FELT WANT

The Idaho Forestry Bulletin, published by the School of Forestry of the University of Idaho is filling a long felt want for some means of furnishing the people with information concerning the forests and forest industries of Idaho. This bulletin, a multigraphed paper, was first published a year ago last January and is issued monthly except in the months of July, August and September. In this short period of time the mailing list has increased from a bare one thousand to over sixteen hundred and requests to be placed on the mailing list are coming in continually. The Bulletin is used in many of the public schools of the state, more particularly by teachers in geography and agriculture.

Any or all of these bulletins may be secured free of charge by writing the School of Forestry, University of Idaho, Moscow, Idaho. The titles of the bulletins published to date are as follows:

Volume I.

No. 1. The Forests of Idaho.

No. 2. The Lumber Industry in Idaho.

No. 3. The Trend of the Lumber Industry in Idaho.

No. 4. The Forest Fire Situation in Idaho.

No. 5. The Forestry Situation in the United States.

No. 6. The Forest Resources of the World.

No. 7. White Pine Blister Rust in the Pacific Northwest.

No. 8. The Fire Season of 1924—A Brief Review.

No. 9. The Clarke-McNary Forestry Act.

Volume II.

No. 1. A Forest Policy for Idaho—Why Needed?

No. 2. Forests and the Conservation of Irrigation Water Supply.

No. 3. National Forests and Road Development.

No. 4. Idaho in Forest Protection.

No 5. Idaho's New Forestry Law.

No. 6. Forests and Recreation.

IDAHO'S NEW FOREST LAW

The forestry bill passed by the Idaho legislature at its recent session and signed by the Governor March 5, marks the culmination of a long time effort to secure for Idaho a law which would give reasonable assurance of permanency in timber production on her forest lands. But at length the effort is rewarded, for Idaho, altho among the very last of the timbered states of the union to act, now has one of the most progressive forestry laws yet written. The new law supersedes the old Fallon fire law tho retaining the good features of the latter.

The law is predicated on the belief that if forest fires are controlled the problem of keeping Idaho's forest land in a state of continuous forest production is largely solved. But any forest law calculated to control forest fires in Idaho must provide for three essentials—executive officers to enforce the law, rational methods of slash disposal, and an adequate protective organization for all forest lands, whether cut-over or bearing merchantable timber.

The law meets the first essential thru the creation of the office of state forester, and a state cooperative board of forestry. The state is exceedingly fortunate in having available as its first state forester, Mr. Ben E. Bush, whose appointment is referred to on another page. He will retain his office at Moscow.

The general administration of the law is vested in a non-political board known as the state cooperative board of forestry, consisting of the governor, as chairman, the attorney general of the state, secretary of state, state auditor, state superintendent of public instruction, state land commissioner, state commissioner of reclamation, dean of the school of forestry at the university, and four citizens of the state, appointed by the governor. Two of the four appointees are nominated by the timber protective associations, one by the livestock industry, and one by the U. S. Forest Service. It will be noted that the board is representative in character, all interests most directly concerned in the use of the forest having membership on it, thus giving the greatest assurance of an impartial administration of the law. A representative board also enlists at once a larger public interest in the success of the law than would otherwise be the case. Its unwieldiness is largely offset thru executive committees consisting of three members each, chosen by the board to represent it in the field in the administration of previously adopted policies, rules and regulations.

The second essential is fulfilled by the slash disposal section. This provides that the slash created incident to logging shall be piled and burned unless another method of disposal is authorized by the state forester.

The broadcast burning of the slash as has been the practice under the Fallon Act not only defeats any reforestation program, but is a failure as a fire preventative measure. That old logging works on which the slash has been disposed of in this way, have been repeatedly burned over is the rule rather than the exception with the result that any natural reproduction is either impossible or long delayed. Probably the bulk of the cut-over lands of the state is in a non-productive condition as a result of repeated fires.

By piling the slash before burning, most of the young growth left after logging is saved, reproduction is practically assured, and the fire hazard is reduced to a minimum. This method of slash disposal is not an experiment. It is in general use on both government and state lands in Idaho, and in more recent years has been adopted by some of the larger operators.

The third essential is met thru the provision that all the forest lands of the state shall be divided into districts to be known and designated as forest protective districts with a view to giving each district adequate and effective protection, the cost to be borne equitably by all owners, aided by federal funds.

Under the old Fallon Act the state was districted only in part, since all protection of private lands was entirely voluntary. a large part of the cut-over land was outside the boundaries of the officially organized protective districts. These lands were commonly known as "no man's lands," and received no protection whatever. Under the new law all such lands will be included in regularly organized districts. This will be done either by extending the boundaries of the districts already organized or by the creation of new districts.

By prorating the cost of fire protection among all owners as the new law does, the

average per acre cost will be substantially reduced. For example, one large association finds that the cost per acre for 1925 figured under the old Fallon Law would be 11.3 cents whereas under the new law the cost will be 6.6 cents, a saving of 4.7 cents per acre. This cost will doubtless be still further reduced by additional federal funds which will be made available this year.

The timber protective associations built up under the old Fallon Law will not be disturbed by the new law, but will continue to function just as formerly.

The new law carries many other features which serve to clarify and strengthen the main essentials. The cooperative board held its organization meeting at Boise, March 16 to 18 to launch the new law and it is now in full force and effect. Governor Moore and many others prominent in the affairs of the state have pronounced the forestry law to be one of the outstanding acts passed by the last legislature. It is at once constructive and far reaching.

In commenting on the law for **The Forest Patrolmen,** Mr. Bush says: "Our new Forestry Law, at this time, seems to be working out very satisfactorily. The lumbermen who are most interested are paying a great deal of attention to the several provisions of the act, and I am confident that it will be fairly well appreciated after one season's operation.

"We have, at this time, created twenty-five districts in the State, covering by far the greater part of the forested area. There are still some isolated districts that should be provided for and I think that we will have these taken care of by the beginning of next year.

"The public, in general, seems to be very much interested, and we have a very large demand for copies of the law and are distributing them over the State.

"We have had some small objection to the compulsory feature and have had some very commendatory responses from others who want to pay for the protection they receive.

"So far, we are working a good deal on the line of former years, i. e., through the organized timber protective associations, and have organized some new ones. We are also cooperating with the Forest Service and they are giving us the most hearty support. Everyone connected in any way with the forested area realizes that slashings are our greatest enemy in the way of a fire hazard, and we are getting better support in the way of disposing of this menace than we ever had before.

"The weather thus far has been ideal for protection and we are hoping that we will have a season like 1916, when we had practically no fires. However, should the weather turn hazardous we are in better shape to handle bad conditions than ever before."

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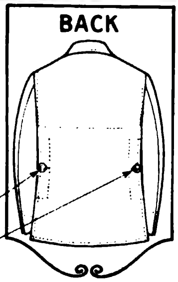

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NEW SCIENCE HALL

Science Hall is a handsome structure of Tudor-Gothic architecture, fire-proof, built of reinforced concrete, faced with brick and stone trimmings, and roofed with slate. Its three stories and attic are designed thruout to provide accommodations for instruction in the sciences. Its central section is 120 feet long, and its east and west wings each approximately 40x68. Large laboratory rooms occupy most of its space. An octagonal lecture room, 45x56, with inclined floor and seating capacity for more than 250 students, occupies the top floor of a two-story north wing. Present cost of this building, as provided for by millage tax levy, has been $180,000. Interior completion and installation of equipment will cost $125,000, which sum is available by legislative appropriation. The building will be ready for occupancy by the opening of the new year. Morrill Hall, shown in the background to the left, is the present home of the School of Forestry.

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FORESTRY AT WEST POINT

Mr. E. W. Chamberlain, writing of his experiences at West Point makes the following interesting comment on the West Point Forest:

"The West Point Forest, comprising that timber land included in the boundaries of the West Point Military Reservation, New York, is one of the most successful experiments in applied forestry in the East. While the timber crop is perpetuated primarily for its scenic value rather than its economic value, still the principles involved are the same and the result has been very satisfactory. The management is directly under an officer who is designated as the Chief Forester and it is the writer's opinion that he has every tree down to the smallest seedling counted and if one is missing investigation begins at once.

"Fires are practically unknown as campers are not allowed in the forest. The nearest railroad is miles away, and thunder storms are rare. Cutting on the reservation is allowed only by permit and only certain designated trees may be cut. The stand itself is almost all hardwood—chiefly maple and oak with some beech.

"The writer's opportunity for observing the practice of forestry here was limited but to judge from the result—a healthy, prosperous and growing stand of timber—the practice has been overwhelmingly successful."

Editor's Note: Mr. Chamberlain enrolled in the School of Forestry, University of Idaho, with the class that graduated this spring but left school to accept an appointment at the U. S. Military Academy, West Point, N. Y. He is visiting his people in Moscow on his first furlough from the academy and expects to be here most of the summer. Mr. Chamberlain will begin his third year there this fall.

SENIOR FIELD TRIP

Accompanied by Supervisor C. K. McHarg and several of his staff, the senior class in forestry spent the week beginning May 18 in an inspection trip over the Coeur d'Alene National Forest. Mr. A. A. Brown, technical assistant, gave the class a very thoro discussion of the management plan of the Coeur d'Alene Forest, going into particular detail on problems relating to regulation of the cut in order to insure a sustained yield. With the management plan in mind, the class journeyed by way of Garwood and the very excellent logging road of the Ohio Match Company to the logging camp of this company's timber sale where the greater part of the week was taken up in a study of marking methods and slash disposal. One day was devoted to actual timber marking under the supervision of experts of the Forest Service.

Trips were made to cutting areas, showing reproduction after logging, various methods of piling and burning slash, and sanitary measures taken to rid the forest of inferior species so as to favor reproduction of white pine, and areas exhibiting different age classes.

Students making the trip were Lewis A. Cummings, Paul M. Harlan, C. H. Hunter, D. R. Malhotra, R. P. McLaughlin, E. W. Renshaw, E. A. Snow and Ralph S. Space.

The class unanimously voted the trip to have been one of the most instructive it had yet made, and wishes to express cordial thanks to Mr. McHarg and his assistants; to Mr. Pearl Bailey, western manager of the Ohio Match Company, and members of his organization; and to the Winton Lumber Company for courtesies extended.

SUMMER FIELD WORK

The forest faculty is occupied during the summer moths with important field investigations. Dr. Henry Schmitz has three parties of two men each in the field on black currant location and eradication as a measure in the control of white pine blister rust. This work is carried on in cooperation with the Idaho department of agriculture and the office of white pine blister rust control, U. S. department of agriculture.

Prof. C. W. Watson, with two student assistants, is engaged in a study of the contents and rate of growth of white pine stands following old burns, with a view to determining how soon these stands will be ready to cut and the yield that may be expected. There are many such stands in the white pine belt, and if protected from fire, they will become valuable holdings in the near future. This is Prof.

Watson's second season on this study.

Prof. H. I. Nettleton, assisted by two students, is continuing the study undertaken by the School in the summer of 1923, on the growth of white pine left on old logging works. His studies show that these residual stands have taken on an increased rate of growth following the removal of the older trees, and that they will be ready to cut in a comparatively short time.

Dean F. G. Miller is completing his report on the university timber lands, a study started last summer, and in cooperation with the Forest Service is gathering statistics on the secondary wood using industries of the State.

FORESTERS, A COSMOPOLITAN GROUP

Just one-half the states of the union, besides India, the Philippine Islands, and Canada, were represented in the enrollment of the School of Forestry for the year of 1924-25. In point of numbers, Idaho, of course, stands first, with a total of 52. Naming the other states, and countries alphabetically, with the number of students from each, we have: Arizona 1, California 2, Connecticut 1, Delaware 1, Florida 1, Illinois 6, Indiana 1, Iowa 1, Kansas 3, Louisiana 1, Massachusetts 5, Michigan 2, Montana 1, New York 8, Ohio 2, Oregon 5, Pennsylvania 2, South Dakota 1, Tennesee 1, Texas 1, Utah 4, Washington 15, Wisconsin 1, Canada 5, India 1, Philippine Islands 3. Of the 127 registered, 108 were long course students, and 19 were members of the ranger course.

Students are attracted to Idaho on account of the superior advantages for forestry training; for situated as the school is, near extensive private, state, and national forests, large logging, and milling operations, as well as secondary wood using industries, unusual opportunity is afforded for practical experience in the woods to supplement class-room work. These conditions also make it possible for students to secure ready employment both during vacations and on the completion of their courses.

RANGER COURSE

The ranger course to be offered again next winter, will open January 4, and close March 26. The giving of the course is one of the major activities of the school, and is conducted independently of the long courses. It is planned for men either in the Forest Service, or connected with some phase of the lumber business. Admission is by special application, and only a limited number of high class men will be accepted.

DEMONSTRATION FOREST, A BOON

The recently acquired 640 acre forest, near Moscow, for use by the School of Forestry, as a field laboratory, and demonstration forest, is more than meeting expectations. It is especially valuable for field work in silviculture, and the class in this course, the past semester under the direction of Prof. C. W. Watson, made an intensive silvicultural description of the entire tract.

THE RANGER'S PRAYER

Oh, Lord in Heaven, hear our plea, give us high humidity;
Spare us trouble, work and pain; send us stormy skies, and rain!
Teach the folks these summer days "Prevent Forest Fires—It Pays";
Keep the lightning from our pines, keep the sheepman in his lines;
Make the cowman know his fault when he fails to put out salt;
Teach the timberman to blush when he fails to pile his brush;
Make us wise to understand these new Manuals at hand;
Make our Supervisor wise, hide our boneheads from his eyes;
Hear this, our meek request, and then we'll do our very best. Amen.

—H. R. Elliot, Malheur National Forest.

THE FOREST FIRE

Who was careless, no one knows;
Yet the fire goes, goes,
Flaming gold.
Now it makes a sudden sally,
Leaving in a once-green valley
Woe untold.

Watch it jump, higher, higher;
'Tis an ancient funeral pyre,
Burning bright.
Like some demon or a devil,
In a sort of drunken revel,
In the night.

Burning this way, burning that,
Laying forests in a flat,
Smouldering mass.
What an orgy now it makes!
Every living thing it takes,
To the last.

Wood folks running helter-skelter,
Looking for some kind of shelter
From the heat;
Running on before the roar,
Run till they can run no more,
With blistered feet.

Then advancing in a cloud,
Laughs the flame fiend in a loud,
Terrific crash;
And the sturdy little band
Perish bravely, as they stand,
In a flash.

On the one who is the cause
All the vigor of the laws
Should be brought;
He should suffer just the same
As the victims of the flame
He has wrought.

—Earl MacTowner, in American Forests and Forest Life.

Forestry

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To

HON. LLOYD A. FENN

In recognition of his contributions to the advancement of Forestry in Idaho the 1926 edition of the Idaho Forester is respectfully dedicated. In particular as a member of the State Legislature Mr. Fenn has always stood consistently for progressive forestry legislation, and he was largely influential in securing the enactment of the Idaho Forestry Law.

IDAHO'S TIMBER TAX PROBLEM

By LLOYD A. FENN, '11

The fundamental rights of the state to raise revenue through taxation, either directly or indirectly, is not open to question, however, the method used in making property subject to levy is one that may well be discussed when the arguments are confined to the limitations imposed by the constitution and are prompted by a desire to conform to the spirit of the law in providing the greatest good for the greatest number.

Property, both real and personal, is subject to taxation or exemption in limited ways as the will of the legislature may direct when so defined by statute as to be in conformity to the purview and meaning of the constitution. That forest lands, or the timber thereon, comes within the classification of property under our law there is no conflict of opinion.

To seek the aid of the legislature in having timber lands, or the growing timber thereon, whether of present or potential value, placed upon the list of property wholly exempt from taxation is imposing upon the good offices of our law makers for the reason that such action would amount to a prayer for a violation of the spirit of the law in that the timber owner is not one to whom the legislature could with propriety offer such relief. However, to seek an equitable adjustment of the present form of taxation is not without merit and may well be pleaded to the end that the state may be properly compensated and the owner made secure in his endeavor.

One important factor in any discussion of the timber tax problem must always be kept in mind. It is, that while an attempt is being made to correct the present evils in our method of taxing timber, it is absolutely necessary that sufficient funds be made available to maintain the local community or rural taxing unit, in which the larger bodies of timber are situate, in accord with present expectations from this source, to the end that no additional burden will be levied against other existing property. Certainly no effort should be made to impair the obligations of such taxing units where this property is now on the rolls and computed in the valuation upon which they were incurred. A large majority of the timber tax laws in force in other states were apparently placed upon the statutes to temporarily reduce this tax burden or postpone it in the hope that reforestation would thereby be encouraged and this was done without apparent consideration of the necessity of a continuous tax being raised annually to meet current expenses, or fulfill obligations.

Where the forest stands are mature the question does not present itself so vividly. Yet, the moment the mature or marketable timber is removed and the cut-over lands show forth,, a very different situation arises. Here the taxable value is practically gone and years of waste land assessments stare the community in the face. This statement is made to apply only to potential forest land and not to the possible agricultural uses which may somewhat change the condition. Idaho is just now experiencing the unfortunate effects of having thriving communities practically desolated by the withdrawal of timber activities which in the first instance brought them forth. Such communities should be continued just as it is hoped that a sustained timber yield may be effected. To equalize this economic difficulty is fundamental to a correct solution of the timber tax conditions, that is, that the local phase be taken care of in any solution which is presented. Were it feasible for the state to assume temporarily, with proper assurance of reimbursement, this burden of equalizing the revenue over the timbered areas it would be possible to offer a graduated tax scale on the severance basis that would meet the situation.

Assume that the sustained annual cut, which it is hoped will be maintained by the operator, was made equal to the annual growth. In such an event the severance tax coupled with the tax on the land, for the purpose for which it is used, would present to the communities a revenue of a constant nature. Fortunately in Idaho there is a state board of equalization which could well care for this particular item in our tax system and so arrange the equalization as to provide the local unit with a just and continuous return and at the same time give a healthy impetus to the timber industry.

The practical method of taxation used by this state in determining the amount of revenue to be derived from the mining industry

suggests a partial solution to the problem confronting the state in its desire to equitably tax the timber within its limits, to the end that the industry may be perpetuated and a taxable wealth maintained.

As the state exacts a revenue from the net proceeds of the mining industry, based upon the previous year's operation as well as a return from the surface valuation, so should the state, devise a method whereby the timber lands and the output therefrom be taxed separately in justice to the owner who maintains a property subject to a variety of hazards unknown to mine owners. By this reasoning it would appear that the state should tax the timber lands, but in a manner that would grant the taxing units a reasonable return in proportion to the value of the land for its crop purposes, also there should be a tax on the timber but at a time when the owner could with business prudence obtain a financial return, that is, when the crop was ripe or in part marketable because of thinning requirements or other silvicultural demands.

Just here a distinction should be drawn in the matter of the permanency between ore in place and the condition of the forest stand. A body of ore, undeveloped, is a permanent thing. A forest, in every condition, is a perishable crop. Only an act of God can dislodge or remove the precious metals from their present lodgement and thereby suffer the ore body to lose its financial attraction to man and a revenue loss to the state. With a forest stand, from the day of its birth to the time of harvest, there is an ever increasing hazard to its life through both divine and human agencies. In the first case the likelihood of destruction is remote, in the latter it is a present menace.

Were all forest lands covered with a mature stand of virgin timber the tax problem would be relieved of many of its vexing features. While maintaining an annual tax on the surface land valuation for timber raising purposes the state would receive a revenue from the marketing operations and such revenue could be so adjusted by a commutation plan as before suggested to provide a return to the state in approximate evaluation to that now received from the timberland tax and thereby suffer no loss to its present revenues from this source and, at the same time relieve the timber owner of the unwarranted burden now borne. Unfortunately this Utopian condition does not exist. In Idaho is to be found every imaginable forest condition from the recently cut-over aras to the mature stands of virgin timber. Age classes of every type and species natural to this region can be had in varying quantities and the persistent hand of the operator, overshadowed by the devastation wrought by destructive agencies, continue to disrupt the ideal situation and make the problem more complex.

With cut-over lands constantly reverting to the state by reason of non-payment of taxes, with the depletion of taxable timber wealth through destructive agencies, with the abandonment of potential timber lands to the state because of impossible financial advantage, all coupled with the constant inroads upon our virgin stands by the operator, what is the prospect for the future? Ruin to the industry that now lays the golden egg unless it be nurtured by just legislation tempered with a vision to the future.

Confronted with the oft repeated statement that the farmer should be relieved from taxation if the timber owner is to have such treatment, it is correct to reply that no reduction of taxes can be sought against the land where the valuation is based upon the use to which the land is adapted or converted. In addition to paying a just tax upon the land the timber owner should pay a tax upon his crop, a requirement that the farmer is not asked, to the end that the timber owner properly compensate the state for the production he receives and, such payment be placed at a figure commensurate with the liabilities assumed by those in other industries or occupations.

Can the State of Idaho, under its present admirable policy of disposing of its public lands, with propriety permit a tax method which will compel an ever-increasing addition to the state holdings by reason of the acquisition of cut-over or otherwise devasted potential timber lands through delinquent taxes? Certainly such acquisitions are in direct conflict with the established policy which apparently has the whole-hearted approval of the citizenry of the state.

True it is, that the county, not the state, receives title to the land. But where lies the distinction? If the state as such is in no position to acquire and hold these lands, how can it be expected that a legal subdivision could finance a business that the state can not see its way clear to assume? The present method

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ENGINEERING ASPECTS OF FORESTRY

By RAPHAEL ZON
Director, Lake States Forest Experiment Station.

Forestry involves knowledge of biology and of engineering science and skill. A forester, like an agriculturist, is a biologist when he deals with timber crops as growing plants. A forester depends upon engineering skill when he harvests the timber crops, transports logs from the stump to the mill, lays out logging roads, builds sawmills and pulp and paper plants, and converts logs into lumber, paper, and other commodities.

In the final cost of lumber, the cost of transportation is probably not less than 75 per cent. A carload of lumber averages about 20,000 board feet. To transport some 34 billion feet of lumber annually cut in this country requires some 1,700,000 cars.

Forest products form not less than 200 million tons of freight annually. Only bituminous coal exceeds forest products in tonnage. The tonnage of forest products exceeds the combined tonnage of all agricultural products. The railroads' revenue from carrying forest products is over $103,000,000—nearly double that received from transporting grain. These figures give an idea of the enormous transportation problem involved in harvesting and distributing the products of the forest.

The transportation of logs from the stump, often in mountainous and inaccessible places, to the mill taxes the ingenuity of the engineer to the utmost. It involves in some places the construction of overhead cables, chutes, flumes, dams, donkey engines, and many other engineering works.

The sawmill machinery, and its adaptation to special uses such as the large logs of the Pacific Coast, is another field in which engineering skill of the highest grade is involved. The laying out of logging railroads, the improvement of drivable streams, all are the work of an engineer.

It is, however, not only the civil and mechanical engineers that are concerned with the use of the forest. The water power engineer, the electrical engineer, the chemical engineer, and the landscape engineer deal more or less with the forest, either directly or indirectly. The phenomenal growth of the lumber industry and the opening of inaccessible regions for logging could never have been accomplished without the skill of the engineer.

Unfortunately, however, the engineering skill of the past, in its relation to forestry, was largely destructive to the forest. The forest was looked upon as a mine to be abandoned as soon as the virgin timber was removed. The engineer's skill was applied to remove this virgin timber as cheaply and efficiently as possible, but without regard to the future of the land in its relation to public welfare.

A new era is coming in which the forest engineer's skill will be applied not to wrecking the forest but to re-creating and perpetuating it.

In the utilization of the forest as a permanent resource, the field for the engineer is even greater than it was in the period just past when he contributed largely toward the rapid removal of the forest. In the forest that is to be regrown and used forever as a permanent resource, permanent roads to make the forest accessible are the first requirement. The development of logging machinery, adapted to logging the new timber crops with the least injury to the remaining young trees, is a task that is still before the American engineers.

The mammoth sawmill is passing out of existence. New types of sawmills and wood-using establishments are coming in its place. The one mammoth sawmill, which sawed only lumber and burned what could not be made into lumber, is being replaced by groups of wood-using plants which supplement each other, and in which one plant works with material that the other cannot use.

The forest is essentially a diversified crop. In a forest one finds trees of different kinds. Some are best adapted to be sawed into lumber. Others can best be used for pulp and paper making. Still others are turned into toothpicks and clothes pins. Even the same tree may yield different products. The lower part of the tree is suited for sawlog material, while the upper part may be used for pulpwood, and the tops and even the branches for chemical wood. Therefore, only a group of

wood-using plants that can utilize the different products of this diversified timber crop can engage in profitable timber harvesting.

What would you think of a packer who would utilize only bacon and hams and throw away the rest of the hog, or of a farmer who was producing milk, beef, pork, corn, wheat, and truck products, yet could sell only wheat, thus making wheat carry the entire farm. This has been exactly the case in the past with our forests and it has made lumbering unprofitable or much less profitable than it might otherwise have been.

A forest that is worked only for the choicest veneer logs and nothing else cannot be indefinitely a paying proposition. It is only when each part of the tree or each kind of tree is put to its best use that timber cropping becomes a profitable enterprise.

Another type of sawmill which has a promising future is the small plant driven by electricity, generated by water power, which cuts only the annual growth of the tributary timber and therefore, will have a permanent life. Many a forest has been wrecked before logging has even started because the sawmill built by engineers was far beyond the capacity of the forest to sustain by annual growth. To feed the sawmill, not only the growth but the entire forest had to be cut and the forest capital was destroyed in the process. The timber owner built a Moloch and then had to bring as a sacrifice the present and the future of the forest.

Another type of sawmill that is coming to claim the attention of engineers is the portable sawmill. This type of sawmill is of particular interest to small woodlot owners or farmers. In many localities, like the New England States, where many an abandoned pasture has come up to second growth white pine, it is the most efficient means of harvesting the crop. This portable sawmill, however, may be a blessing and it may also be a detriment to the owner of the small woodlot.

A small portable sawmill, usually equipped with a circular saw, produces large proportions of rough lumber of inferior grades. As a matter of fact, the product of a portable sawmill is seldom graded, and therefore, brings only a low price on the market. When a woodlot owner has some fine old timber of oak, hickory, and other valuable species, and it is sawed up by a portable sawmill operator, the chances are that the product coming from high grade logs is greatly degraded.

It is, therefore, important for every woodlot owner to carefully consider, when he has timber to sell, whether it would pay him better to sell his high-grade logs to an efficient sawmill or to have them sawed by a portable sawmill and try to sell his ungraded lumber in the open market. My own experience shows that a farmer can do much better in such cases to sell his logs to an efficient sawmill, as he will get a higher return by selling the logs than by having them sawed by a portable sawmill and then selling the lumber.

On the other hand, if a farmer needs some rough lumber for a barn or some other rough construction and he has timber of his own, it might be cheaper for him in the long run to have a portable sawmill saw his timber than buy lumber at a retail lumber yard at high prices.

An individual owner of a woodlot, however in every case is at a disadvantage in comparison with a large timber owner. The solution for the woodlot owner lies in cooperative marketing of his woodlot products. If cooperatize marketing is essential for the farmer in his agricultural products, it is even more essential in the case of his woodlot products. As a rule, a farmer knows better the value of his hogs, his corn, or his wheat, than he knows the value of his timber crop. He is likely to be cheated in many ways.

There are 44 different log rules by which timber may be estimated. Some of them give high values for large timber and very low values for small timber. Others are more advantageous to the buyer than to the seller. Sometimes the farmer may receive apparently a high price for his logs, yet when the underrun of the log rule is considered, he obtains but a small price for his total product.Sometimes, the farmer may have a few trees, such as black walnut or yellow poplar or oak, but yet not enough to ship to a distant sawmill because it does not make a full carload. If farmers of a certain locality would pull together and handle their woodlots on a cooperative basis, they could hire a reliable man who could advise them as to the kind of log rule to use so as to get the greatest value from their timber and the best use for which they could sell it. I have seen many splendid white oak logs, that would saw out high grade

veneer and bring high prices, sold for bolts to be made into tight stave cooperage which brings but a few cents. By cooperative marketing in carload lots, each individual farmer could get a much higher value for his product and, through the advice of the expert, have his woodlot left in a much better growing condition than it was before.

Therein lies a distinct obligation on the part of the engineer to devise a portable sawmill or a method of transportation for the farmer's woodlot products that would net him the highest possible return on his woodlot crop. The agricultural engineering departments at many of our colleges give a great deal of attention to agricultural machinery,—separators, ploughs, threshers, and what not. How many agricultural engineering departments have given a thought to the portable sawmill, particularly adapted to the needs of farmers in a given region? This is a field which so far has received but scant attention on the part of agricultural engineers and a field in which our county agents can be of immediate and direct benefit to the farm woodlot owners.

Engineering skill is involved in the utilization of forest products. Within the last few decades there has been a phenomenal growth of the chemical wood industry, in the use of wood either for the production of pulp and paper or for the chemical by-products, like acetic acid, methyl, and quite recently ethyl alcohol, acetone and others. The chemistry of cellulose is still in its infancy and the field is practically unlimited.

The water power engineer has a direct interest in forestry since the forests regulate stream flow and protect the watersheds.

The sanitary engineer, especially if he is concerned with municipal water supply, finds in the forest the best purifier and protector of the water.

Wood is such an important construction material that the construction engineer and the architect are vitally interested in wood, whether for bridges, buildings, derricks, ties, or for any other purposes.

Finally, the forests are a most important landscape feature and trees are often the basis of landscape engineering. A landscape engineer who has a keen appreciation of the beauties of the natural forest can learn to use it to secure the finest aesthetic effects.

Forestry plays an intimate part in agricultural engineering. I need to mention only a few examples. Forest planting is one of the most potent means of fixing shifting sands which in many localities are a distinct menace to agricultural crops, as, for instance, on the Pacific Coast, and on the shores of the Great Lakes. A forest growth is the best binder of the soil, and in localities where gullies are a grave menace to farm lands, it is a tool which in the hands of a skillful engineer may become the means of stopping erosion and reclaiming eroded land to productive use. The forest as a windbreak for protecting buildings and crops against dry, hot winds in summer and cold blasts in winter and especially as a means of uniform distribution of snowfall, is a useful tool in the hands of the skillful engineer. Windbreaks in such states as North and South Dakota, by preventing the drifting of the snow into gullies and then distributing it more evenly over the fields, contribute to the useful work of the snow water in the spring. It tantamounts to increasing the precipitation in such states.

There are in the northern portions of the Lake States, Michigan, Minnesota, and Wisconsin, vast areas of swamp lands. Some of these lands are just open bogs or muskegs. Others are covered with forest growth of rather inferior development. At present these areas are considered as waste land. A great deal has been said about draining the swamps for agricultural use. In some places the draining of such swamps, far in advance of agricultural needs, has proved a great burden upon the community. In the Northern part of Europe, Finland, Scandinavia, and Russia, from vast areas of swamp forest lands the excess water has been removed by superficial ditching, and the timber growth increased from two to three times, making those lands profitable for timber growth.

The drainage for improvement of forest growth is not the same as drainage for agricultural purposes. It is a fairly cheap method. It does not involve bone-dry drainage. It does not increase the fire menace in dry peat bogs. It does not destroy the habitat of wild life. On the contrary, by making the forest growth more vigorous and the cover denser, and by encouraging forest growth where no growth at all existed before, it increases the area

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SOME PRINCIPLES TO GUIDE THE MARKING AXE IN WESTERN YELLOW PINE IN THE NORTHWEST*

By R. H. WEIDMAN
Director, Northern Rocky Mountain Forest Exp. Station

When a forester marks a stand of western yellow pine for timber sale cutting on the national forests he leaves his record in the woods for half a century. Not only his contemporaries but succeeding generations of foresters will judge him by this record. If his work is not done well, the condition of the stand will betray it so that he who runs may read. The evidence will be plain that there was little more than a perfunctory swinging of the marking axe, a mere mechanical operation of putting blazes on trees. On the other hand, if the marker's work is good—if it is compounded of intelligence, judgment, ideals, and an appreciation of the silvicultural possibilities—the results on the ground will be a noble monument to his handiwork.

Objects of Marking—

The essential reason for marking a stand of trees is to harvest the mature timber in such a way as to secure a second crop by natural means. The underlying principle is continuous forest production. To guide the marker, it is necessary to list certain specific objects of marking. In the western yellow pine type these are:

1. To harvest the ripe timber.
2. To release advance reproduction and encourage its development as the basis of the second crop.
3. To secure new reproduction following cutting, wherever advance reproduction does not already exist.
4. To accelerate the growth of trees left standing in the form of seed trees or reserved trees.
5. To reduce the chances of future loss by windfall to a minimum.
6. To make the logging operation a profitable one, consistent with the above objects.

The Importance of Advance Reproduction

Above all things, perhaps, the marker in this type should understand the importance of advance reproduction. Second growth in western yellow pine does not spring up as a crop of new seedlings immediately after logging, as in the case of Douglas fir and western white pine. Nor is the seed stored in the ground. In the open yellow pine stands, seed germinates under the mature trees soon after it falls to the ground. This results in a cover of advance reproduction. It is important to bear in mind that this is not the result of one seed crop, but the combined result of a number of years of seeding, germination and establishment of seedlings. There are several reasons for this long period of regeneration. One is that yellow pine bears a little seed from year to year, good seed years come only at intervals as great as 5 to 8 years. Another is that it furnishes a most attractive food for rodents, and because the forest is so pure over large areas, the meager annual seed crop is probably largely consumed by these rodents. The most important reason, however, is to be found in the severe drouth and killing frosts which are a regular part of the summer climate of the yellow pine region. Thus, even though successful germination following a good seed year may give rise to an adequately stocked cover of seedlings, severe frosts and droughts in the first two or three years may cause so heavy a mortality among the tender seedlings that only a small proportion will survive. Under these difficult conditions of establishment it requires a number of years—sometimes as much as 20 or 25 years—for the seedlings which survive from year to year to make a satisfactory crop of young growth. Although the forest reproduces itself almost entirely by this slow method, advance reproduction is fairly abundant over most of the yellow pine region of the Northwest.

Fire is the worst enemy of advance reproduction, both before and after cutting. On old cut-over areas, where fire did not run over the ground either before or after cutting, there are dense stands of reproduction composed, for the most part, of advance reproduction well established before cutting. Where fire ran over the ground and destroyed the advance repro-

(1) Although this article contains no serious differences with existing Forest Service marking policy, it is best to state that it expresses primarily the author's views and experiences.

duction, the cut-over areas have a very scant or scattered young growth, or none at all, even in cases where two or three seed trees per acre survived the fire. Why this is so is apparent from the fact that advance reproduction is established under a full stand of seed-bearing trees in the virgin forest; whereas reproduction, originating after cutting and burning, is established under a very few seed trees.

Character of Stands

The age condition of a stand, is of considerable importance as far as marking is concerned. Several typical conditions in this respect can be recognized in this region. The most common is that of pure yellow pine in which the stand is characterized by uniformly large, yellow-barked mature trees with an abundant cover of advance reproduction on the ground. There is here a noticeable deficiency of the intermediate-aged poles and bull pines. What young trees or bull pines there are, occur chiefly as widely scattered groups of ¼ to 1 acre in size. Rarely there are small pole stands of 10 to 20 acres. There is a very distinct lack of individual poles and bull pines scattered throughout the older timber. Here the relation of young and old trees is exactly the reverse of that in a true selection forest where the young trees should greatly outnumber the old ones. Another typical condition is that of the mixed stand in which white fir, Douglas fir, and larch are the most common associates. Although these stands contain a large amount of mature and overmature trees, there is usually a good representation of young trees, poles and reproduction, due largely to the presence of the tolerant species. A less typical stand condition in pure yellow pine is one in which the overwood of mature and overmature trees is quite open, owing to stag-headed trees and trees that have died through decadence during the past century. In the openings are found bull pines and large groups or patches of pole age-classes, and in the case of the more recently made openings, excellent stands of advance reproduction. Although this condition is not desirable from a pathological standpoint, it is the nearest approach to a balance of the age classes such as should be had in a selection forest.

It is important that the marker learn to recognize these conditions, and others that may be found, and that he base his marking on the character of the forest as he finds it. For example, if the typical condition of a body of large mature trees with good advance reproduction is found, the indicated treatment would be to mark rather heavily, leaving the minimum required for a second cut. The aim would be to get a two-story forest. On the other hand, if the stand condition is one containing a good representation of intermediate-aged young trees, poles and saplings, the indicated treatment would be to mark only the mature trees and secure a true selection forest of the remaining age classes.

Character of Individual Trees

The characteristics of the tree, which the markers should consider, are its age, size, crown, bark, bole, injury and location with regard to windfall. With regard to age, the tree which is left standing should not, in general, exceed the age at which it can produce seed and make a profitable volume growth. In size, great height in trees to be left must be avoided, in order to safeguard against windthrow. Large diameters, approximately above 22 or 24 inches in the northern part of the region and 30 inches in the southern part bordering on California, should be avoided, for the reason that they usually go with great height or old age. The crown of a tree offers the most and best indications of its fitness to be left in marking. Its shape indicates whether it is dominant or suppressed, and whether it is growing rapidly or slowly. The length, color, and density of the foliage indicate the health and vigor of the tree. These latter factors together with cones on the tree or under it, indicate the tree's seeding capacity. The color and thickness of bark indicate age and vigor.

The best sort of tree to leave as a seed or reserved tree is characterized by a pointed or slightly rounded crown of dark green, dense foliage, reddish brown bark in ridges, or thick yellow bark in plates, and a straight bole without injury. The crown should occupy preferably a third of the length of the trunk. Thin, open crowns or very small, tuft-like crowns are worthless for reserved trees or for seeding purposes. Crowns badly infected with mistletoe, which sometimes present a very dense and luxuriant appearance, are also worthless for reserved trees. Thin, scaly bark of a reddish or purplish hue indicates an old and very slow-growing tree which, as a rule,

is unprofitable to leave for the purpose of seeding or increased growth.

Where it is desired to maintain a selection stand after cutting, the marker should select his individual trees so as to secure the maximum accelerated volume growth. To be able to do this, the marker must have some knowledge of the subject of increased growth due to liberation. A group of trees is like an unthinned hill of corn. The latter as planted contains a large number of small slender-stemmed talks. If we leave one of these hills unthinned, containing possibly 12 stalks, and thin another, leaving only two or three stalks, we have an excellent example of accelerated growth due to liberation. The thinned hill will eventually support large thick- stemmed and vigorous stalks, while the unthinned hill will produce much smaller and slenderer-stemmed stalks of corn.

Studies in stands which have been liberated for a number of years show that the trees remaining made an increased volume growth of 100 to 300 per cent. Any timber marker may see examples of this accelerated growth himself by using an increment borer in trees left on old timber sales or private cuttings. The occasional use of an increment borer, by the way, will prove not only interesting to the marker himself but will improve the quality of his work. It would be very desirable, in fact, if the increment borer had a much wider use than it has at present. The chief point in securing accelerated growth is to free each reserved tree as much as possible. For example, a stand which is cut so as to leave fairly evenly-distributed trees will make better increased volume growth that one where the reserved trees are left in groups. The effect of liberation is felt as far as 50 feet; that is, if two trees are standing 50 feet apart and one is cut the other shows a little increased growth.

There is a common fault in the selection of individual trees to which some markers are subject. In leaving a selection stand, it is the object as much as possible to leave a nice, even distribution of reserved trees. In the zeal to do this the marker leaves, sometimes unconsciously, either trees which are too large or too old, or trees with poor, thin crowns. This was more commonly a fault of the early days, but there are still examples of it to-day.

Seeding

It is well for the marker to know something about the frequency of seed years, and to observe for himself regarding them. Although it is not yet definitely known how often good seed years occur in the yellow pine type in this region, studies indicate that one fairly good seed year may be expected every 5 to 8 years. Annual examinations of seeding and reproduction on a large permanent sample plot on the Whitman National Forest, show that there was, in that locality, an exceptionally good seed year in 1912 which was followed by poor and indifferent seed years until 1921 when the seed production was classed as fairly good. The results on this particular plot agree fairly well with the ranger seed crop reports for all parts of this national forest for the same number of years. In considering seed years, it is well to keep in mind that good seed years are not always general over a whole region. In 1912 there was a good seed crop all over the Whitman National Forest, but in one or two instances since then there has been a fairly good seed crop in one small section of the Forest and poor seeding on the remainder of the Forest.

The very important point with regard to seeding, which the marker should know, deals with the size of seed-bearing trees. Observations show that young trees, under 17 or 18 inches d. b. h., in this region, cannot be depended upon as satisfactory seed-bearers for a number of years. Any forest officer can observe this for himself, by visiting a cutting 15 or 20 years old and examining the reproduction and particularly the old cones under trees of various sizes. Cones of various seed years can be recognized by their state of weathering and decay. In this region very few old cones will be found under trees less than 17 or 18 inches d. b. h. The lesson, of course, is not to depend too much on trees less than this size for seed production.

Insects

An elementary knowledge of the habits of bark beetles is necessary to good marking. The particular point in mind, in this connection, is the difference in the work of the yellow pine beetle (Dendoctonus brevicomis) and the turpentine beetle (Dendroctonus valens). The former kills trees and the latter as a rule, does not. The presence of the former can be recognized by pitch and frass exudations found anywhere on the trunk of the

tree, the pitch exudations containing a little hole or tube. The presence of the turpentine beetle is recognized by pitch exudations, without holes, on the lower part of the trunk, occuring rarely higher than five feet above the ground. At present when a marker sees pitch and sawdust exudations on the lower part of a tree trunk, he either pays no attention to this at all or he marks the tree because he sees it is infested with some kind of a beetle and assumes that it will die anyway. Such a tree may be a healthy one which he would ordinarily leave as a seed tree or reserved tree. The lesson here, of course, is that he should mark such a healthy tree infested with the dangerous bark beetle and not the one containing only the turpentine beetle. The marker's observations in this respect may be checked by examining the immediate neighborhood for evidence of beetle-killed or dying trees.

Diseased Trees and Snags

In the early years of timber sales in the region, close attention was given to the marking of fungous-infected and mistletoed trees, whether they were merchantable or unmerchantable. Later the practice grew up of emphasizing the removal of snags as of more importance than the felling of diseased, unmerchantable trees. There was a dangerous fallacy in this, which it is believed the latest marking rules have corrected. In the yellow pine type of the Northwest the number of trees that are unmerchantable because of disease is rarely great enough to make their elimination prohibitive in timber sale operations.

Windfall

Windfall is an especially important problem for the timber marker in the Northwest. Violent wind storms occur periodically throughout the region. The weather records for 25 years at Baker, Oregon, show 15 storms in which the wind velocity exceeded 35 miles an hour and frequently was as high as 45 and 50 miles. The record of disastrous windfall shows that there may be expected, somewhere in the region, once in every two years, violent storms capable of throwing down timber. On May 26, 1913, and September 18, 1914, there were two storms on the Whitman National Forest which together blew down nearly a million feet of timber on two sale areas, or 17½ per cent of all the timber that had been reserved. On February 7, 1915, and March 17, 1918, two heavy storms on the Crater National Forest each blew down several hundred thousand feet on several timber sales. In November 1917, a number of seed trees were blown down on a Douglas fir sale on the Umpqua National Forest. On April 2,1920, another storm on the Crater National Forest threw down 5½ million feet of yellow pine timber on a number of sales, and in virgin timber. In January, 1921, the most disastrous windfall experience of the region was felt in the Olympic Peninsula, where altogether over 6 billion feet of timber were withthrown.

The violent storms, as a rule, do not cause damage generally throughout the region. They are catastrophic only in spots. Along with the catastrophes, however, which hit here and there every few years, there must be expected a normal loss from windthrow. Studies of old cuttings, 25 years old, show that this normal loss in stands left after cutting occurs at the rate of about ¾ of a tree per acre each decade. The total loss due to all causes including insects, fungi, lightning, and windfall, was shown to be about one tree per acre per decade.

Although the whole of the Pacific Northwest seems to be subject to the catastrophe of heavy windfall, normal windfall loss is often concentrated in spots within a timber sale unit. Such particularly exposed spots may be recognized by the marker in the virgin forest by windthrown trees of various ages on the ground at such points. Such spots and their immediate vicinity should, of course, receive a different treatment in marking than the remainder of the area.

Where windfall appears to be a constant danger, it is believed the practice should be followed of marking heavily in the danger spots and leaving more than would ordinarily be left on the protected areas. The result of this practice will be to maintain the desired percentage of reserved trees on the unit as a whole. The present practice too often is to mark heavily everywhere, regardless of areas which may be comparatively safe. The idea is to leave on the latter areas some trees which the marker is not willing to take the chance of leaving on the exposed spots. In selecting trees to withstand windfall, the marker must consider several factors. The tree should not have great height or an excessively large or top-heavy crown. It should not be in very shallow soil. The best type of tree to withstand windthrow is one of

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The Mullan Tree

THE MULLAN TREE

By C. K. McHARG, JR, Forest Supervisor, Coeur d'Alene National Forest.

In the late fifties the need for a route of communication through the Inland Empire from the head of navigation on the Missouri at Fort Benton, to Fort Walla Walla near the Columbia, was pressing. Congress appropriated funds and Lieutenant John Mullan, afterwards Captain Mullan, was assigned to the task of constructing a military road between the two points; 450 miles of wilderness, much heavily timbered mountain slopes, the continental divide and the Bitterroots to cross.

The vicissitudes of the undertaking are chronicled casually in Captain Mullan's letters and reports. The trials, dangers, difficulties and disappointments were accepted with true pioneer spirit. The suspicion of the Indians was overcome by fair dealing and straightforward diplomacy.

During construction, exploring parties were continually looking for better routes to make as long a season road as possible. The overflow of the lower Coeur d'Alene and St. Joe Rivers every season was a severe handicap and the feasibility of lowering the level of Coeur d'Alene Lake by blasting out a new channel at the "Little Falls of the Spokane," (now Post Falls) was considered.

On October 12, 1860 Lieutenant Mullan wrote to his commanding officer from Fort Walla Walla in part as follows:

> "In obedience to your verbal instructions of the 13th of September I left the Mission," (the old Mission at Cataldo), "and proceeded as far as the Wolfs Lodge Prairie which is the first camp ground from the Spokane Trail".

Thus Lieutenant Mullan traversed for the first time on September 14th, 1860, what was to be the location through this section of his military road and what now is the site of the only virgin white pine type through which the transcontinental highway passes.

It was customary to mark the Military Road with the insignia "MR". One of these markers was established and remains today where Lieutenant Mullan journeyed on that day nearly 66 years ago. It was fitting that an Idaho white pine, the Mullan Tree, was selected to bear this mark, "MR July 4, 1861."

From that date the canyon which the road followed received its name. Now "Fourth of July Canyon" is known to all who travel the Yellowstone Trail.

Motor transports demanded a high speed highway so that the new grade bears a little to the east of the Mullan Tree, but for 55 years traffic passed over Mullan's Military Road at this point. Today the traveller can follow the old grade for 200 yards joining the new Yellowstone Trail at both ends.

Vandals carved initials on the tree and souvenir hunters chipped the bark. To overcome this the local communities of Coeur d'Alene, Wallace and Kellogg have built an iron fence for protection.

An area of about 160 acres surrounding the tree has been set aside from the Coeur d'Alene National Forest and dedicated to public use as a camp ground. Here, on historic ground, one may spend a few hours or days in camp, with the conveniences of fireplace and pure water. Surrounded by timber, so typical of North Idaho and of North Idaho only, almost unchanged in aspect from Lieutenant Mullan's day to this, with the Mullan Tree bearing silent witness to pioneer days now gone, one can well feel the spirit which carried civilization into the Inland Empire.

POTLATCH LUMBER COMPANY TO SURVEY ITS CUT-OVER LANDS

A study of more than usual significance is to be conducted this summer on the cut-over lands of the Potlatch Lumber Company. The study will be made under the immediate direction of Norman G. Jacobson of the Western Forestry and Conservation Association, Portland, Oregon.

In this study the cut-over lands will be divided into three classes—those carrying residual stands of timber, that is, trees which were just below merchantable size at time of logging; lands bearing reproduction which had started when logging took place; and lands which have reproduced since logging.

The state, at the same time, will make a similar study of such of its cut-over lands as are intermingled with the company lands, since these two classes of holdings logically constitute a unit.

This study is being made by the Potlatch Company as a first step looking toward the possibility of putting its operation on a sustained yield basis.

THE CLARKE-McNARY LAW PROGRAM

By RUSSELL N. CUNNINGHAM, '17

In charge, State Cooperation in Fire Control, District One, Forest Service.

There seem to be two fairly distinct schools of thought on the matter of a forest policy for the Nation. One is what might be called the Pinchot group, which believes that direct federal control of fire protection and even lumbering is the only solution of the forestry problem of the United States. The other group whose policy is pretty well expressed in the Clarke-McNary forestry bill, believes that more substantial progress can be made by the Nation co-operating with the state, and the state co-operating with the private interests and so on; all trying to work out a solution together.

The Capper Bill which was introduced in the Senate a few years ago outlines the program of the federal control advocates. Substantially the same bill is again being introduced this year. Its general scheme can be seen from the manner in which it regulates lumbering. A tax of $5 per thousand feet is placed on all logs as they are cut. The law provides, however, that a rebate up to $4.95 will be made if the operator conforms to certian rules which are made for each operating district. In the white pine region, this would doubtless mean piling and burning the slash and probably leaving some seed trees or other silvicultural measures which are consideded desirable.

The immediate aim of the Clarke-McNary program, according to the report of the senate committee, which sponsored it, is:

(1) To remove the risks and handicaps from private timber-growing as far as practicable. (Fire protection and taxation are stressed.)

(2) To extend public forest ownership in areas where special public interests or responsibilities are involved; and also where the natural difficulties, costs, and hazards attending reforestation render it impracticable as a private undertaking.

Its Method is "Co-operation With the States."

The program consists of:

(1) A co-operative study to devise a plan of adequate fire protection for each state.

(2) Financial co-operation to put such a plan into effect.

(3) A co-operative study of forest taxation.

(4) Co-operative planting on farms.

(5) Extension work in forestry to bring good forestry practices into wider use among farmers.

Four sections of the Act deal with enlargement of the national forests. Taken with cestion one of the Weeks Law and various land exchange laws, machinery is available to extend these public forests by adding a large acreage of suitable land now in public ownership and to acquire by purchase, gift or exchange, other large areas of privately owned land. Purchases are limited, however, to certain designated districts and land exchanges to areas within the present national forest boundaries.

The Clarke-McNary Act is but one more step in the state co-operative plan—not necessarily the final step. The real starting point for this program was the Weeks Law of 1911, which initiated co-operation with the states in fire protection. The Clarke-McNary Act goes considerably farther in fire co-operation than the Weeks Law, and takes up other important phases of the problem. Taxation is recognized as one of the main obstacles to proper handling of privat eforests. The place of farm woodlots in the national program is acknowledged for the first time.

Accomplishments

In fire protection, the Weeks Law has undoubtedly been a great stimulus to the timbered states in providing suitable patrol. During the thirteen years of its operation, the number of co-operating states rose from 11 to 29, the area protected increased threefold, and the combined expenditures of states and individuals on still greater proportions. During the first year of operation of the Clarke-McNary Act which has now replaced section two of the Weeks Law, four additional states have joined in the program. The greatest annual appropriation under the Weeks Law was $400,000. This fire co-operation program has resulted, not in adequate protection, but in very substantial progress as is shown by these figures.

The Nation's fire plan in round numbers is about as follows:

Adequate fire protection for all state and private lands is estimated to cost $10,000,000.

The federal government should eventually

stand one-fourth of this total or $2,500-000. Owners and the states should bear the rest.

This is the basis for the authorized appropriation of $2,500,000 in the Clarke-McNary Act. The first appropriation, however, was only $660,000, which permitted the federal government to give each state with which it is co-operating 7.4% of the amount necessary to give adequate protection. (Idaho received $24,780.) The states were asked to use this money to extend or intensify protection, not to replace funds already supplied by the state or by individuals. (In North Idaho, it was divided between the associations after each had agreed to patrol the cut-over lands within its boundaries.)

Legislation

State forestry laws have a close relationship to the Clarke-McNary forestry program, as have likewise the extension and betterment of fire protective associations. While much of the progress along these lines cannot be said to be a result of any national forestry laws, still the Clarke-McNary plan may be said to be a success if without anything else, the states and associations develop laws, policies and practices which satisfactorily meet the situation.

Twenty-six of the 42 states which had legislative sessions last year adopted 71 important forestry laws. These laws most frequently deal with the fundamental problems of taxation and fire protection. Idaho's forestry law was probably the outstanding example of legislation dealing with nearly all angles of the problem. It aims at permanent and adequate protection for all of the forest land, it provides for removal of the slashing menace and it prevents unregulated use of fire during the dangerous season. It does not deal with taxation, but by creating a representative forestry board it provides machinery for handling such delicate problems in the future.

Planting and Farm Forestry

Twenty-five states have applied for co-operation or have indicated that they wish to apply in the project of supplying tree seed and planting stock to farmers. The University of Idaho has entered into an agreement with the federal government to carry out this phase of the work. Up to $2,000, the federal government will match University funds to allow the Forestry School to develop its nursery for this purpose.

About two-thirds of the states are dealing more or less with forestry in their agricultural extension work. $50,000 from the current Clarke-McNary appropriation is made available for encouraging this work. Since about one-third of the remaining forest land in the United States is in farm woodlots, the importance of this phase of forestry cannot be taken too seriously.

Taxation

Forest taxation is essentially a state problem, that is, only the states can bring about any suitable reform in the present system. However, the federal government is proposing to assist in a systematic study of the situation to discover weaknesses and develop remedies. State and county officials, forestry schools, forestry organizations, and forest industries will be asked to cooperate in this study. Fred R. Fairchild of Yale University, an authority on taxation, has been chosen to direct the federal activities along this line. New tax measures were passed last year by Michigan, New Hampshire and Ohio. In several other states, notably Oregon and Washington, committees have been appointed to study the situation and to recommend legislation.

The net area of the National Forests was increased practically 300,000 acres during the federal fiscal year 1925, by transfer of forested military reservations.

It appears, therefore, as a national program, the Clarke-McNary Act is beginning to bear fruit.

The Idaho Problem

The greatest forestry problems in this state have to do with the cut-over lands. It is here that taxes and carrying costs are most burdensome, fire protection most difficult, and the future ownership of the land most problematical. When this land is cut off, there is need that the slash menace be removed. There must be protection from fire for a long period of years. Taxes and fire protection costs must be such that the owner can feel optimistic about holding the property, else it will revert for taxes. Possibly the state or the nation must take over part or all of these lands.

If these and similar problems can be worked out in a co-operative way, by private agreement or state law, the Clarke-McNary program will be a success. If they remain unsolved, it will be a failure and something in the nature of the Capper Bill will have to follow.

THE TREND OF FOREST FIRE RESEARCH IN NORTHERN IDAHO

By H .T. GISBORNE,
Associate Silviculturist, Northern Rocky Mountain Forest Exp. Station.

Readers of the Idaho Forester do not need to be told why it is necessary to study forest fires in Northern Idaho. They have seen the fires sweep through virgin stands of merchantable timber and through beautiful young stands of valuable reproduction, greatly reducing the value of the merchantable trees and often completely destroying the young stands which soon would have been merchantable. The readers know that there are different causes of these fires, that some fire seasons are much worse than others, that some fires behave altogether differently from others, and that the cost of suppression, the actual cash value destroyed, and the ultimate loss to the State of Idaho vary as these factors vary. It may be of interest to explain how the United States Forest Service, especially the Branch of Research, is studying these variable conditions, and how the information obtained may be used to reduce the present high expense and loss caused by forest fires.

Coping with the annual crop of forest fires is somewhat like handling the annual sales of a certain seasonal article, rubber galoshes for instance. The manufacturer of rubber overshoes who meets the demands for his product satisfactorily needs to know four things as accurately as possible. He must know the season of the year when the demand begins, reaches a peak, and ends. He must know what sections of the country will make demands and the peculiarities of that section. He must estimate the amount of that demand. And he must know the classes of people who create the demand.

In forest fire protection the problem is very similar. We must know the average beginning, peak, and end of the fire season. We must know these facts for each section of the District. We must know about how many fires to expect in each section. And we must know the individual causes of these fires. The accumulation over a period of years of accurate records of the time of occurance of fires, their location, number, and causes will soon provide statements of the average conditions which must be met.

In Northern Idaho both the Federal and State Forest Services and the private timber protective associations have kept records long enough so that each organization now knows its average conditions very accurately. The fact is becoming all too apparent, however, that it is the departure from the average which is of greatest interest now. We have reached the stage in which we can supply adequate protection during the average year, but we are not yet prepared to guarantee adequate protection during the abnormal season, or to cut down our expenses and save the money that could be saved during years that are less dangerous than average. Most efficient protection means adequate protection at minimum cost The purpose of forest fire research is to discover the fundamental causes and effects which vary in such a way as to cause variable demands on the forest protective organization. When we know accurately all the controlling causes and their effects we should be able to expand the protective organization sufficiently to give adequate protection during the abnormal years, and to reduce expenses as much as possible and still provide adequate protection during the fire seasons that are less dangerous than the average.

In this investigation of cause and effect we usually have the effect clearly before us and then have to discover the cause or causes. Fires burn the forest materials; we know that, and we know what starts these fires. But why do most of these fires occur between June 15 and September 15 each year? Apparently the answer is, because the fuels are driest and most inflammable then. Is that the whole story, or is it also true that there is more lightning then, that there are more campers, hunters, and smokers in the woods, and more logging operations active in the summer than in the winter? How much of the variation in beginning, peak and end of the fire season should be charged to drier fuels and how much to the presence of the causative agencies? Obviously, if there were no agencies present to start forest fires, there would be no fires, even if the forest materials became drier than ever

before. But there are certain agencies always present, whereas there are seasons of the year when they do not produce forest fires. Apparently, then, the dryness or wetness of the fuels is the most important control of the starting of fires at least.

Working on this hypothesis, the fire studies conducted by the Northern Rocky Mountain Forest Experiment Station are attempting to determine how much moisture is in each of the important forest fire fuels from the beginning of the fire season, through the peak of the season, and to its close. Such information is useless for our purposes, however, unless we also know how much moisture in each fuel prevents its ignition, how much moisture permits ignition, and this in each case for each of the common causes of forest fires such as lightning, broadcast slash fires, burning brush piles, campfires, matches, smoking tobacco, etc., down to the tiny sparks from locomotive stacks, ash pans and brake shoes.

Obtaining such information calls for experiments, because we cannot wait for the slow process of obtaining records by finding a blazing match thrown by a careless smoker in each of the fuels at various moisture contents, or catching a camper leaving his fire first in duff, then on rotten wood, then in sound wood, etc., for each moisture condition of each fuel. We can duplicate those conditions experimentally, however, and that is the process being used to determine the amount of moisture in each fuel which prevents or permits its ignition by each of the common causes of forest fires. Lightning is the sole exception to this statement, and because we cannot duplicate lightning, as well as because we have not yet been present when lightning started a fire and left us intact to measure the moisture content in the fuel ignited, we have no measurements at all concerning when the fuels can or cannot be ignited by lightning.

So far most of our experimental tests of ignition have been devoted to the top layer of duff, the carpet of dead and decaying tree leaves, etc., covering the humus and mineral soil in the forest. Several reasons exist for choosing this particular material instead of twigs, slash, windfalls or snags as the object of our first work. The living forest is the most valuable type which we have to protect, and in the green forest, either young or old, there is undoubtedly more surface area covered by the duff than by any other type of fuel. The duff is a nearly continuous fuel; it is not broken up into small patches as often as twigs, dead branch wood, and windfalls. Without running through the duff so that it can ignite separate patches of the other fuels, fire can seldom spread rapidly or attain the momentum necessary for it to burst into a sheet of flame in the crowns of the trees. Hence, if the duff, especially the topmost layer, will not carry fire there is not as great a probability that a fire once started in some other material will spread rapidly. The amount of moisture in the top layer of duff is, therefore, of great significance. Furthermore, our measurements, which now include four consecutive fire seasons, have shown that the amount of moisture in the top layer of duff is usually about the same as the amount in dead branch-wood or slash, and is usually a little less than the amount in the outside half-inch wood of windfalls. A knowledge of the moisture content of the top layer of duff consequently indicates the amount of moisture in the other important fuels and, if used in conjunction with a knowledge of the relation of duff moisture content to duff inflammability, tells us whether or not fire will run through the duff, and how easily.

Eventually we must study the effect of moisture content on the inflammability of each of the other fuels. We already know, for instance, that rotten wood will hold and carry fire even when it has as much as 63% moisture content, or 63 pounds of water for every 100 pounds of dry rotten wood, whereas no case has yet been found in which the duff was burning when it had more than 25% moisture content. Such differences indicate the necessity of studying each fuel separately. We have commenced by concentrating on the duff alone and have found some facts which seem to have real practical value.

How will we use such information when we get it for all the fuels? Perhaps somewhat as follows: On the wall of his office the forest ranger will have a chart with the dates shown along the base and the fuel moisture contents up the left side. Perhaps twice each day the ranger or his assistant will read the instruments properly located to reveal the moisture content of each important fuel on nearby areas which are typical of his district. He will then plot those readings on his chart and observe:

"Well, the effects of that last rain are cer-

tainly disappearing faster than I thought they would. Twigs have dried out till they are extremely inflammable, the top duff is highly inflammable, dead branch wood and slash are in the zone of medium inflammability, snags are in the low inflammability zone, windfalls very low inflammability, and the lower layer of duff still has enough water so that it is non-inflammable. Only yesterday morning all those materials except twigs were too wet to burn. After the rain I put all my guards and smoke-chasers to work building new trails and repairing old ones but I guess I'd better put them back on patrol or keep them close to the phone to-day."

Or, in the opposite condition, the ranger will find that the fuels are still wet enough to permit him to keep his men working on improvements instead of fire protection. Early in the season the measurements should show him when the fuels are becoming dangerously dry, and, therefore, whether or not he will need his emergency men sooner or later than usual. In the fall the measurements should show when the temporary fire protection men can be released or diverted to other work. Measurements, instead of estimates, will point out the departures from the average condition and tell when to spend more money for adequate protection, and when to save money and still maintain satisfactory protection.

At present when rangers or forest supervisors want more men and more money to obtain better forest protection, the common questions from the guardian of the purse strings are:

"How are your fires behaving?" and "how dry is it on your Forest?"

If there are fires burning so fiercely that they cannot be suppressed with the available men, that is demand enough for more men and money. But sufficient men and money should have been on the job before those fires began to burn so fiercely.

If the ranger or supervisor is anticipating great danger before the fires appear, how will he answer the question "How dry is it on your Forest?" Will one supervisor say "too dry to suit me" another "Really quite dry," and another "Extremely dry"? And if they use these terms how will Purse Strings decide where it is driest, and which Forests should receive assistance?

It may help if Supervisor No. 1 says "My average fuel in the timber dropped below 20% moisture yesterday, and the average fuel in the old burn type is down to 11%." Supervisor No. 2 was not watching his forest conditions so closely, however, and he reports an average of 15% in the timber and 7% in the old burns. He probably gets men and money immediately and a warning not to wait so long next time. Supervisor Number 3, is unduly scared when his timber type reaches 25% and his open areas 15%. Money is withheld from him and safely saved.

Using measurements instead of estimates of dryness and using the same classes of fuels in each case so that one estimate is not based on duff dryness, another on dead weeds, and another on slash, such a reporting method should be more dependable than that available at present. One goal of fire research in Northern Idaho is to supply such a method of measuring existing fire danger.

Photo by H. T. Gisborne, U. S. Forest Service

The highest degrees of fire danger prevail when sparks and embers, blown ahead of a large fire, start spot fires as in this case.

Measurements of prevailing moisture content are not enough, however, for the most efficient forest protection. We need forecasts for the future, as well as accurate statements of the present. As soon as we attempt to forecast fuel moisture content and inflammability, however, a new relationship of cause and effect springs up to demand further research. We may have found that moisture content controls inflammability, but if we are going to forecast either of those conditions we must know of an existing condition is not an accurate forecast of that same con-

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A REPORT OF A COTTONWOOD STUDY IN SOUTH IDAHO

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Instructor in Forestry

One of the finest stands of cottonwood in Idaho is located along the banks of Wood River, in Blaine County. This unusual body of timber, averaging one half mile in width, shows its best development between Ketchum and Bellvue, a distance of approximately twenty miles by river.

The stand is divided into three distinct types, as follows: a pure cottonwood type, which prevails as the dominant type along the river banks; second, a cottonwood-aspen type lying behind the cottonwood and along the edges of of the first old benches, which represent the previous water levels; third, pure aspen, occupying these first low benches and extending back to the higher sagebrush mesas.

At present, comparatively little direct use is being made of this timber, outside of its ground cover value. Stock growers in Wood River Valley have utilized the timber as shade and protection to cattle and sheep and farmers have used some timber for posts, temporary corrals and stack enclosures. A small sawmill located near Hailey, is utilizing the best grade of cottonwood logs for egg crates, for which a limited market has been developed.

In order to determine the amount and quality of this timber, its location as to ownership, its rate of growth and its greater possible utilization by the land owners of Wood River valley, the School of Forestry sent the writer and two student assistants to map and cruise the area during July, 1925.

General Procedure

The problem of primary control was settled, after some experimenting, by assigning to one man the job of mapping the main river by plane table, pacing for distance and leaving numbered stakes at each turning point of the traverse courses. This man worked on either side of the river, depending upon the amount of brush encountered. The opposite river bank automatically served as inside primary control for the timber units on that side. The greatest difficulties encountered in primary control were brush, death of fords and lack of identified section corners for map ties. In mapping thru three townships, but five positive corners were found, including the one from which the map was started. The average error in horizontal control was five per cent.

The other two men, one on each side of the river, secured secondary control by running a compass traverse around each timber unit, starting from turning points left by the man on primary control, pacing for distance and tying in to the latter's stakes below. Each evening these unit traverse notes were plotted on the base map. Very little difficulty was encountered in tying in secondary control.

As soon as each of these outside unit controls was completed, the cruiser ran strip cruises, one half chain wide and of varying length, depending on the size of the timber block. All trees were estimated, down to 3" D. B. H., with frequent caliper checks against ocular judgment. The length of each strip was paced, recorded by tally register and. after a sufficient number of parallel strips were run to complete a unit, the strip area was figured in the field and recorded on the cruise sheet for that unit. Timber types were mapped and cruised separately. By this method of mapping and cruising. an average speed of one mile per day was maintained.

In order to construct a local volume table and a rough yield table, 188 cottonwood trees were selected thruout the stand, measured for D. B. H. and merchantable height to the first fork. and borings were taken at D. B. H. to secure age at that point. The following table heading illustrates the method of recording these field data:

Tree No.	Species	D. B. H.	Merchantable height to first main crotch in 16' logs	Top Diameter	Age at D. B. H.

Office Work

Two rainy days were utilized in securing the ownership from the county assessor's office in Hailey of all timbered forties along the river. The next step was the construction of a local board foot volume table with which to figure the cruise volume. A curve of merchantable height in 16 foot logs, based on D. B. H., was first constructed and harmonized. From this curve were read the values found in columns 1 and 2 of Table I.

Table I

Column 1 D. B. H. Inches	Column 2 No of 16′ Logs	Column 3 Top Dia. inside bark	Column 4 Vol. in Bd. Ft.
7	0.75	6.0	10
8	1.50	6.0	30
9	1.75	6.1	40
10	2.25	6.2	60
11	2.50	6.4	90
12	2.75	6.6	110
13	2.75	6.9	130
14	2.75	7.3	160
15	2.75	7.9	180
16	2.50	8.6	190
17	2.50	9.5	200
18	2.25	10.5	210
19	2.00	11.7	220
20	2.00	13.0	260
21	2.00	14.4	330
22	2.00	15.9	400
23	2.00	17.5	490
24	2.00	18.2	570

It will be noted that the number of logs increases up to a 15″ diameter and then drops. This is due to the fact that the larger trees were more open-grown with lower main forks. Merchantable height was taken only to the first main fork, assuming that breakage in falling would ruin the few logs above that point.

A second curve of top diameter inside bark based on D. B. H. was then constructed from the field data, and from it was secured the top diameter shown in column 3, Table I. From the data secured from the first two curves, namely top diameter and merchantable heights, a set of graphs was constructed by scale to represent the actual dimensions of each size class. These graphs were divided into log lengths and the top diameter of each log was read from the scaled cross-section. By applying the board foot values of the Decimal C log rule to the log dimensions shown on the graphs, the volumes were secured for each size class. A third curve of volume on D. B. H. was then plotted and harmonized and from it was read the volumes shown in Column 4, of Table I.

Using this volume table, the strip cruise of each timber unit was then figured, but before it could be applied to the entire unit it was necessary to determine the percent of cruise. To do this, the base map was corrected, and the corrected area of each unit was then secured by the use of a planimeter. The per cent of cruise for each unit was then determined, applied to the strip cruise and the total volume per unit secured. The per cent of cruise on the seventy mapped units ranged from 4.6 to 52.5, with an average of 16.85 per cent for the stand.

A tabular statement of results was drawn up with the following headings:

Unit No.	Area in Acres	Bd. Ft. Vol. Cotw'd	Aspen	Location T	R	Sec.	40 No	Ownership Name	Address	Approx. Area
1	7.7	13,470	40,300	4N	17E	12	10-15	John Doe	Hailey	Total or ½, etc.

The right-hand column refers to the portion of any unit which belongs to any one of two or more owners as indicated by the forty-lines on the type map. The total mapped area was 1460 acres cruising 8,935,000 board feet of cottonwood and 323,000 board feet of aspen.

In order to get a rough estimate of future yield, a curve of age based on D. B. H. was constructed and harmonized and from it the following table was made.:

D. B. H.	Age
7	34.5
8	35.5
9	36.5
10	37.0
11	38.0
12	38.5
13	39.5
14	40.5
15	41.0
16	42.0
17	43.0
18	43.5
19	44.5
20	45.0
21	46.0
22	47.0
23	47.5
24	48.0

In order to use this table in estimating yields, data were taken from the unit stand tables to show how many trees of each diameter class remained on the land after cutting down to an arbitrary diameter limit of 12″ D. B. H. The above table shows that in five years a 7″ tree will have reached a diameter

to 13". Multiplying the number of trees per acre of each diameter class by their respective volumes now and five years hence gives the volume increase per acre in that length of time. The following table illustrates the method:

Yield Table for Pure Cottonwood Stand

1925				1930			1935		
DBH	Vol. Bd. Ft.	Trees per Acre	Volume per Acre	DBH	Vol. Bd. Ft.	Vol. per Acre	DBH	Vol. Bd. Ft.	Vol. per Acre
7	10	12.3	120	13	130	1600	19	220	2710
8	30	11.7	350	14	160	1870	20	260	3040
9	40	8.6	340	15	180	1550	21	330	2840
10	60	10.0	600	16	190	1900	22	400	4000
11	90	8.2	740	17	200	1640	24	570	4670
		Total	2,150		Total	8,560		Total	17,260

It will be noted from the above table that if the cottonwood had been cut, in 1925, down to a 12" diameter limit, there would have remained a residual stand of 2150 board feet per acre which would have increased to 8560 board feet per acre in five years and to 17 260 board feet per acre in ten years. These figures are based on the asumption that loss from windfall in the next ten years would be negligible and would be counterbalanced by the growth of those trees which were less than 7" in diameter at the time of logging.

No yield table was made for the aspen as the trees in the pure aspen type were generally crooked, and of little commercial value except as treated fencepost material. A second yield table was made, however, for the cottonwood in the cottonwood-aspen type and is given as follows:

Yield Table for Cottonwood in Cottonwood-Aspen Type

1925				1930			1935		
DBH	Vol. Bd Ft.	Trees per acre	Volume per acre	DBH	Vol. Bd Ft.	Volume per acre	DBH	Vol. Bd Ft.	Volume per acre
7	10	4.6	50	13	130	600	19	220	1010
8	30	6.0	180	14	160	960	20	260	1560
9	40	4.1	160	15	180	740	21	330	1350
10	60	5.1	310	16	190	970	22	400	2040
11	90	3.9	350	17	200	780	24	570	2220
		Total	1,050		Total	4,050		Total	8180

This table shows a residual stand of but 1050 board feet of cottonwood as compared to 2150 board feet in the pure cottonwood type, a stand of 4,050 board feet in 1930 as against 8560 board feet and 8,180 board feet in 1935 as compared to 17,260 board feet of pure cottonwood; in other words the increased volume growth of cottonwood in the mixed type is approximately fifty per cent of that in the pure stands.

RECOMMENDATIONS

Cottonwood has been ranked as second only to the red gum for crate material. If a market for thicker crate material than is now used for egg crates could be developed, the loss thru sawkerf and excessive warping of thinly sawed material could be considerably reduced. Cottonwood decays rapidly when exposed to moisture, unless treated, but is very serviceable for indoor framework in barns, machine sheds and other outbuildings.

In order to secure greater utilization of smaller material by the owners of the local mill, it is suggested that investigation be made of a possible market for excelsior, which is used extensively for packing furniture, glassware, toys, druggist's and confectioner's goods. It is also used extensively in the manufacture of mattresses. Cottonwood ranks first among American woods in excelsior production and the initial investment for machinery in its manufacture is relatively low. Single upright excelsior machines cost from $150 to $200 installed and more could be installed as the market warranted increased output. By using one or more excelsion machines in connection with the egg-crate industry, the smaller logs could be utilized.

It was noted during the field investigation, that a considerable number of cottonwood posts were being used by the farmers, espec-

ially for the temporary fencing of hay stacks. Four to five years were given as the maximum life of these posts, untreated.

Dr. E. E. Hubert, Professor of Forest Products, has outlined the following statement on the preservative treatment of cottonwood and aspen posts:.

"Cottonwood fence posts, untreated may last no longer than two or three years under conditions favoring decay. On the other hand, the same post, when seasoned and well-treated with a good preservative, may last twenty-seven years under similar conditions. Tests on cottonwood, made by the Iowa State College at Ames and by the Chicago, Boston and Quincy Railroad Company, indicated that the normal life of untreated cottonwood in service is not more than three years while properly creosoted cottonwood ties in service for sixteen years showed a removal percentage of only 1.1 due to decay while for untreated cottonwood the removal percentage was 96.5.

Due to leaching it is not believed that such preservatives as zinc chloride or sodium fluoride would give as good service as creosote.

The cost of treating 5 inch cottonwood posts with a good grade of cresote as given by the Iowa report is about 13 cents per post. Usually the cost varies from 7c to 12c per post according to the condition of seasoning of the post, the method of treatment and the preservative used.

I would suggest the use of a good grade of creosote and the following method of treating your cottonwood posts:

1. Peel and season the posts. (Do not season too rapidly.)
2. Treat the lower three feet for two hours in hot creosote using a temperture of 220°F.
3. Allow posts to remain in cooling creosote for 8 to 10 hours or in a separate barrel or tank containing cold creosote.
4. Dip the tops in hot creosote (220°F) for 15 minutes. (This is to prevent top rot.)

Barrels, metal drums or metal tanks may be used to heat the creosote. Where wooden barrels are used a handy method is to connect two barrels near the bases by means of a large metal pipe. Heat can be applied around the pipe and in this manner the creosote can be heated in the two barrels.

There is no question regarding the value of treating posts. The Iowa report gives a total cost of 19c per 6 inch cottonwood post, untreated. This post lasted three years. A treated cottonwood post, 4½ inches in diameter cost 69c, but lasted twenty-seven years. In the first case the cost per post per year was about five cents, while in the second case it was only three cents. The saving due to reduction of replacement costs is not included, although this would give an additional figure in favor of the treated post."

Treated cottonwood has also been recommended as mine prop material, for which there is a possible local demand in connection with nearby mining property.

Several factors enter into the cutting of this stand of timber which preclude a definite recommendation as to cutting methods. In the first place, cottonwood is very intolerant of shade and requires plenty of overhead light for its development. This fact would suggest that clear cutting would be the logical method of harvesting the timber.

In that case, at least one good seed tree should be left per acre and every fourth tree left should be a male tree for pollenization purposes. These trees should be marked ahead of cutting operations and during seed bearing time, when the male and female trees can be readily distinguished. The flowers of the female tree are inconspicious as compared to the bright red and yellow staminate flowers, and are the ones which produce the cotton or seed balls.

The seed remains fertile for a short time, only, and requires bare mineral soil for ready germination. Due to the heavy under cover of brush and grass on most of the Wood River cottonwood areas, it would not be safe to recommend natural seeding as a certain method of reproduction. A better plan would be to cut the timber to a very low stump height, preferably six inches or less and not over twelve. Such low stumps from those trees which are not over twenty-five years of age would produce sprouts from the ground collar, thus combining the sprouting and natural seeding method of reproduction. The best sprouts

(Continued on page 38)

A PRELIMINARY STUDY OF SHRINKAGE IN IDAHO CONIFERS

by COLLIS H. HUNTINGTON, '26 [1]

Purpose of the Study

It was the object of this study to make a preliminary investigation of the shrinkage during air seasoning of the wood of seven different conifers. Briefly the subject matter of this article is concerned with the shrinkage of wood.

The resultant defects of shrinkage have led to a more or less unwritten classification unfavorable to many woods on the market today. Before any attempt has been made to encourage the use of some of the more undesirable species of wood, little attention was given to the favorable qualifications possessed by such woods for any use. However, now that a timber shortage is anticipated within a short period of years, it behooves the conservationist to furnish the public with reliable data relative to the properties of wood, in order that new economic uses and a demand may be created for those classes of trees now commonly looked upon as "weeds". A more or less ideal condition would be one which permitted harvesting all available mature timber in mixed stands at a profit.

Such defects in shrinkage as a relatively large decrease in size, loose knots, warping or any variation from a true or plane surface,[2] checks or lengthwise separations of the wood, and collapse or the caving in of the surface of a piece of wood, are often limiting factors in the selection of wood to be used in precise work. When the requirements are not as exacting, defects of the nature just mentioned may result in either cull or degrade. Shrinkage defects would not affect or be limiting factors in the use of wood in many instances such as the use of wood for fuel. However, it is essential to use seasoned material whenever boards or dimension stock must remain well joined. The degree of seasoning in joints varies considerably with the use to which the material is to be put, for seasoning involves shrinkage and an absorption of moisture involves a swelling of wood.

SCOPE AND METHOD OF THE EXPERIMENT

Apparatus

The apparatus used for the collection of data in this test consisted of steel calipers, a balance, and a Fries electric drying oven. The steel calipers were graduated to read accurately by means of a vernier, to one one hundredth of a centimeter. The balance used could be read accurately to the nearest tenth of a gram. The drying oven was of the type commonly used for experimental purposes.

Origin of the Data

In making tests of the nature of this study, it is essential that a detailed study be made of many specimens, in order to obtain a normal average. The present report is termed preliminary because only a few tests were made of the various species studied. With one exception readings were made from twelve test blocks as indicated in table No. 1.

Table No. 1

Common Name	Scientific Name	Grain	Serial
Western larch	*Larix occidentalis*	Slash	1-12 incl.
Western larch	*Larix occidentalis*	Edge	13-26 incl.
Western white pine	*Pinus monticola*	Slash	27-38 incl.
Douglas fir	*Pseudotsuga taxifolia*	Slash	39-50 incl.
White fir	*Abies grandis*	Slash	51-62 incl.
Western red cedar	*Thuya plicata*	Slash	63-74 incl.
Engelman spruce	*Picea engelmanni*	Slash	75-86 incl.
West. yellow pine	*Pinus ponderosa*	Slash	87-96 incl.

Data on Species Used in the Test.

Specimens of the species listed were obtained in the form of mill run material from the Potlatch Lumber Company's mill at Potlatch, Idaho. The slash grain material was in the form of 1x8 rough stock, and the individual pieces measured approximately 12" in length The edge grain material consisted of rough stock 1"x3"x14". The size of the final test blocks varied with the individual blocks. Essentially, however, the dimensions were as follows:

Slash grain material (all species) length along
- grain ....6"
- width ....8"
- thickness ....1"

Edge grain material (larch only) length along
- grain ....7"
- width ....8"
- thickness ....1"

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1 Appreciation is expressed to the Potlatch Lumber Company for collecting and forwarding to the School of Forestry the material used in this experiment, and to Dr. E. E. Hubert of the School of Forestry who was influential in obtaining the material for these tests, and who gave freely of his time and ability.

2 Dept. Circular 296, p59, U. S. Department of Agriculture.

The final test blocks were obtained by sawing the original blocks across the grain. Figure 1 illustrates the method of marking the blocks so that the dimensions could be taken at the same place at each weighing.

Lines AC and BD are lines joining the mid points of the sides of the block. To measure the thickness of the specimen the calipers were placed over the edge of the block at the points A, B, C, and D; and along the sides of the lines AC and BD on which the letters are placed. The average of the four readings gave the mean thickness of the piece. The length of the piece was taken along the line AC on the side of the line marked by the

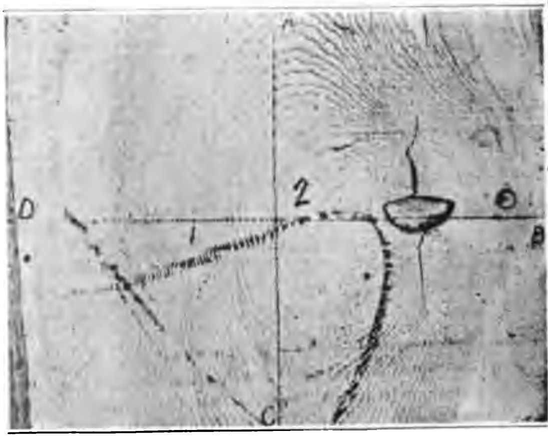


Figure 1, showing a loose knot resulting from shrinkage in Western larch.
Note markings used in measuring.

number 2. The width was measured along BD on the side marked by the figure 2.

Readings were taken during air seasoning until consecutive readings and weights indicated that shrinkage had ceased. The blocks were then put in the oven and readings were recorded as in air drying.

DATA

Before taking any of the data, a table was made up (table 2). Each species was tabulated as shown in the table, tabulations being made simultaneously for all test blocks of the same species.

Having a complete set of data for all species and taken at regular intervals of time, it was possible to work out a curve (average of all curves of one species) showing the rate of shrinkage below the fiber saturation point. The percentage of volume shrinkage was used as the ordinate, and the percentage of moisture content for the abscissa. The relation as just outlined was worked out for a moisture content below 40 %.

MOISTURE CONTENT

Air-dry Material

It was found that the wood of all species contained about 12% of their oven dry weight in moisture when reduced to air-dry conditions. The figure of 12% is based upon the final oven-dry condition at 100 degrees Centigrade, assumed for this calculation to contain 0% moisture. However, wood contains a small amount of moisture even when kiln dried for a long time at 100 degrees centigrade. Record estimates that kiln dried wood at 100 degrees Centigrade still retains two or three percent of moisture[3].

Mill Run Material

Coniferous trees vary a great deal in the amount of moisture contained in the mill run material. The tests just conducted showed a variable range in the relative moisture content of mill run material.

3 Record, S. J., Economic Woods of the United States, 2nd Ed., 1919.

Table No. 2—Preliminary table (headings)

Species— Western Larch Set No. 1

Number of test block	Weight in grams	% Moisture Content	Dimensions: Length in cms	Width in cms	Thickness (A)	(B)	(C)	(D)	Average
1	526.5	65.5	15.40	20.46					2.425

Species —Western larch Set No. 1 (Continued)

Volume (product of three dimensions)	% Volume shrinkage (calculated from air-dry volume(	Time of measuring, weighing, etc.	Remarks
769		5pm 2-22	block is sound

Table 3

Relative Moisture Content of Mill Run Material (unseasoned)

Species	% Moisture content (oven dry basis)
Western larch	44 - 75
Western white pine	34 - 163
Douglas fir	29 - 79
White fir (grandis)	68 - 226
Western red cedar	21 - 172
Engleman spruce	34 - 149
Western yellow pine	30 - 188

Fiber Saturation Point.

The fiber saturation point in wood is that state at which the free water in the lumina of the cells of the wood has been removed, but at which the moisture is still retained in the cell walls. If wood were to shrink uniformly, free water within the cells would be totally removed before any of the moisture in the cell walls was given up. It is the opinion of the writer that under ideal conditions of kiln drying wood, this condition might be approached very closely, for the wood is heated more or less uniformly throughout and the free water in the innermost cells of the wood tends to volatilize. In as much as shrinkage does not take place until the moisture within the cell walls begins to be given up, the wood should retain its shape except for the collapse of a few of the outermost cells until the fiber saturation point is reached. The gradient curve based on shrinkage percent as the ordinate, and moisture content as the abscissa would then show a very sharp break at the point of fibre saturation. After passing the fiber saturation point the curve would flatten out.

In air seasoning the cells in the outermost part of the wood give up the free water first and then are drawn upon for a part of the water and other materials in solution within the cell walls. At the same time that the outer cells are giving up a portion of the moisture within the cell walls, moisture is "working out" from the innermost cells by osmotic pressure. The osmotic pressure is applicable because the pressure is reduced in the outer cells as the moisture in that portion of the wood volatilizes, and the free water in the innermost cells then diffuses outward thru the semi-permeable cell wall membranes. The free water from within therefore passes from a region of relatively high pressure to a region of low pressure. When the free water has been partially removed from the innermost cells, wood often reaches a more or less stable condition under ordinary atmospheric conditions. Air dry wood is therefore never uniformly seasoned in dimension stock.

Koehler has advanced a very reasonable theory for the shrinkage of wood.[4] He states in part that, "vegetable cells are composed of fine particles that have an affinity for water. The water is held between the particles and separates them somewhat. As the water within the cell walls dries out, the film between the particles becomes narrower, and the particles are drawn together by a mutual attraction causing shrinkage of the cell walls. The combined shrinkage in all of the cell walls produces a decrease in the size of the whole piece".

The curves, (Fig. 2) illustrating the rate of volume shrinkage in the woods studied, are for the most part very regular. In plotting the curves a point is reached in each curve, below which the curve seems to be more or less of a straight line, and above which the curve tends to flatten out gradually approaching a horizontal position. The point at which this change takes effect in the curve may be considered to be indicative of an approach to a state of fiber saturation.

Tieman found that the point of fiber saturation in green wood was between 20 and 30% moisture content. The average of his studies gave a value of 27%. The following figures indicate the position of the fiber saturation point in the plotted curves obtained from the data in this study.

Table 4

Apparent Point of Fiber Saturation.

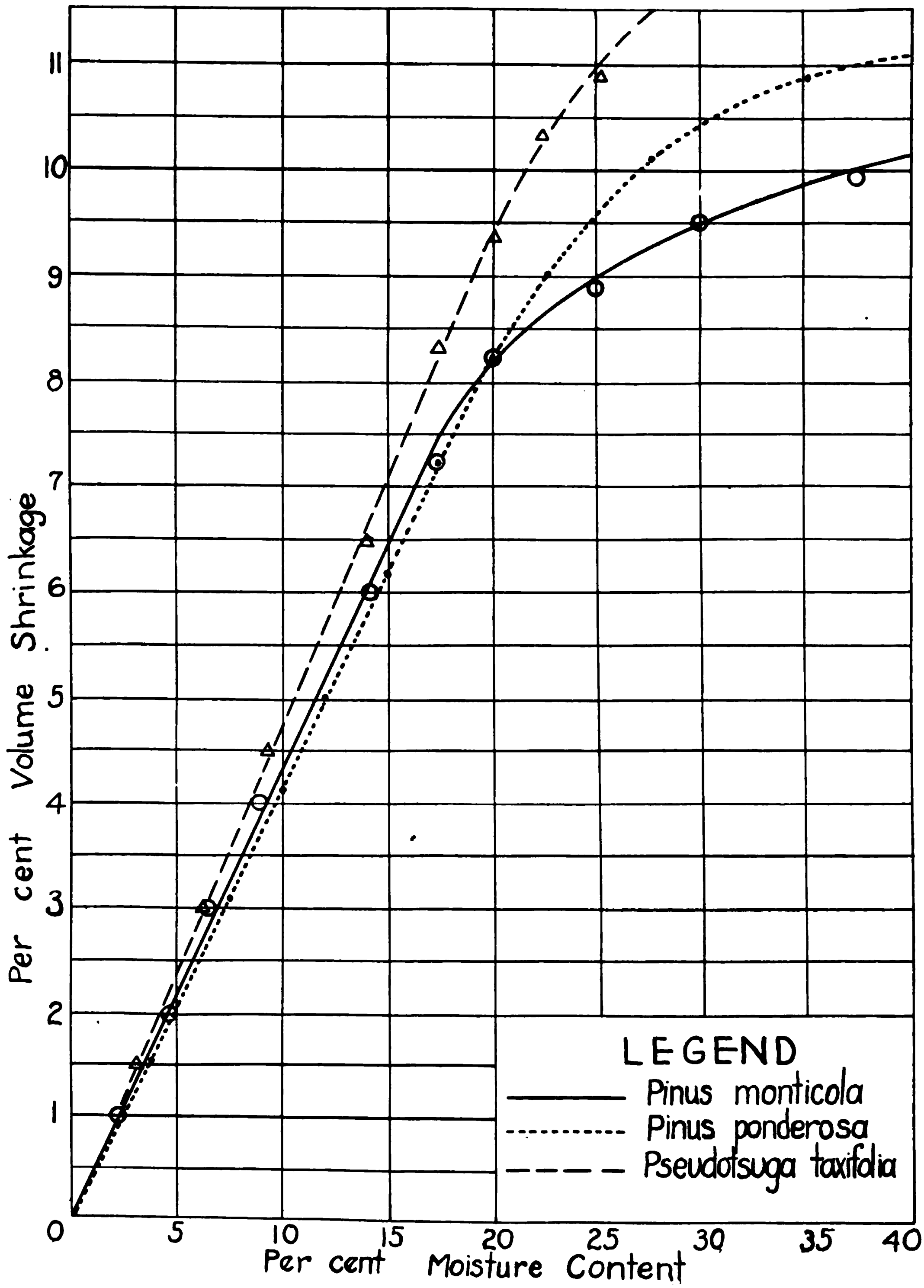
Species	% Moisture Content at apparent point of Fiber Saturation
Western larch (edge grain)	17.5
Western larch (slash grain)	17.5
Douglas fir (slash grain)	20.0a
White fir (slash grain)	20.0
White pine (slash grain)	22.5
Western red cedar (slash grain)	17.5
Engelman spruce (slash grain)	22.5

a. Fiber Saturation Point for Douglas fir is apparently high.

In Table No. 5 is given the percentage of volume shrinkage for the three arbitrary moisture content groups—0-10%, 10-20%; and 20-30%. The tangential, radial and longitudinal shrinkage is given separately for each species between the moisture limits of 0 and 30%. The high values for Douglas fir may be accounted

4 The Shrinkage and Swelling of Wood p3, Forest Products Laboratory, Mimeograph Bulletin.

Figure 2


Per cent Volume Shrinkage
0
1
2
3
4
5
6
7
8
9
10
11
5
10
15
20
25
30
35
40
Per cent Moisture Content
LEGEND
Pinus monticola
Pinus ponderosa
Pseudotsuga taxifolia

for in part by the fact that some of the test boards contained early decay, which was difficult to detect. However, the fact must not be overlooked, that the test material was mill run and not selected samples.

Table 5

Showing Shrinkage in Air-Seasoning Below 30% Moisture Content (based on oven-dry conditions)

Species	Slash Grained	Edge Grained	% Volume Shrinkage 0-10% Moisture Content	10-20% Moisture Content	20-30% Moisture Content	% Tangential Shrinkage 0-30% Moisture Content	% Radial Shrinkage 0-30% Moisture Content	% Longitudinal Shrinkage 0-30% Moisture Content
Larix occidentalis		X	0-3.9	3.9-8.2	8.2- 9.1	0-7.1	0-2.6	0-.14
Larix occidentalis	X		0-5.1	5.1-8.4	8.4- 9.8	0-6.8	0-3.6	0-.19
Pinus monticola	X		0-4.3	4.3-8.2	8.2- 9.5	0-5.9	0-3.6	0-.13
Pinus ponderosa	X		0-4.1	4.1-8.2	8.2-10.5	0-6.2	0-4.3	0-.16
Pseudotsuga taxifolia	X		0-4.7	4.7-9.3	9.3-11.9	0-5.7	0-3.1	0-.19
Picea engelmanni	X		0-4.6	4.6-9.0	9.0-10.8	0-5.7	0-3.2	0-.20
Abies grandis	X		0-4.2	4.2-8.5	8.5- 9.8	0-7.9	0-3.4	0-.19
Thuya plicata	X		0-3.4	3.4-5.6	5.6- 6.6	0-4.4	0-2.5	0-.16

Extent of the Shrinkage in Wood

The extent of the shrinkage in wood varies with such factors as the direction of the grain of the tree, the density, and to a less degree with the species. Tangential shrinkage is about twice as great as the shrinkage radially, while the shrinkage longitudinally is almost negligible. Table 6 gives the species listed in the order of greatest shrinkage.

Table 6

Species Listed According to Maximum Shrinkage Rate

Maximum Volume Shrinkage Below 10%	Below 20%	Below 30%	Tangential Shrinkage Below 30%	Radial Shrinkage Below 30%
W. larch (EG)	D. fir	D. fir	Wh. fir	Yel. pine
D. fir	Eng. spruce	Eng. spruce	W. Larch (SG)	W. larch (EG)
Eng. spruce	Wh. fir	Yel. pine	W. larch (EG)	Wh. pine
Wh. pine	W. larch (EG)	Wh. fir	Yel. pine	Wh. fir
Wh. fir	W. Larch (SG)	W. larch (EG)	Wh. pine	Eng. spruce
Yel. pine	Wh. pine	Wh. pine	D. fir	D. fir
W. larch (SG)	Yel. pine	W. Larch (SG)	Eng. spruce	W. Larch (SG)
W. red cedar	W. red cedar	W. R. Cedar	W. R. Cedar	W. R. Cedar

EG—Edge Grain. SG—Slash Grain

NOTE—In the above tables the values for Douglas fir in the volume shrinkage were the result of the mean average from all of the test blocks of that species and in as much as many of the test blocks were defective the values are undoubtedly high. The values obtained for the data on tangential and radial shrinkage were taken from the most uniform blocks.

Cupping or the tendency of wood to turn away from the center in drying is due to the greater shrinkage along the growth rings or tangentially than radially. It is because of this phenomenon that wood quarter sawed will not cup so easily. In these tests it was found that the white fir, Douglas fir, and spruce cupped very readily. The shrinkage tangentially in these species is proportionally greater than in the other species included in the test. Larch lumber cut from the center of the log should show the same results. The larch blocks used in this test were for the most part from the center portions of the log, so that the phenomenon of cupping was not outstanding in this species. The fact that the larch edge grain shows a higher proportional shrinkage tangentially than the slash grain specimens of the same species, would indicate that there is considerable resistance offered to tangential shrinkage in slash grain. Another factor that would bear out this theory is the fact that when an attempt is made to flatten the cupped specimens they will usually break readily with the line of cleavage radiating from the angle of cupping. When a cupped board is run into the planer rolls, the board will split with a break similar to that just described.

Cupping is most predominant in those specimens containing a large proportion of summer wood. Rapid grown specimens of Douglas fir and spruce illustrate this point. Most rapid grown wood is characterized by a large proportion of summer wood.

In general the heavier a wood is the more

it will shrink when reduced to an oven dry condition. It has been found that heavier pieces from the same log shrink more than lighter specimens. It is because of this factor that light woods are usually preferred in instances where the wood is subject to much change in moisture content.

The density rule of thumb will hold in general for the shrinkage of wood, but there are certain species that deviate from the standard. Basswood is a light wood but shrinks more than one would expect.[5]

Koehler found that there was a little difference in the shrinkage of heartwood and sapwood.[6] Occasionally defects show up in the form of checks and the like, that would indicate that sapwood shrunk more than the heartwood, but the shrinkage is due principally to the fact that sapwood acts quicker than heartwood to changes in atmospheric conditions. Wherever the edger has left strips of bark on the mill run material, it is possible to note the fact that the bark shrinks much more than the adjacent wood.

Conclusions

Conclusions drawn from the data obtained in this experiment, may be summarized as follows:

1. It is essential to use boards and dimension stock seasoned to a moisture content corresponding to that of the place where used, in order to secure tight joints. The moisture content should be about 5% for inside flooring, and 12% when the material is exposed to such climatic conditions as those prevalent in and around Moscow, Idaho.

2. Quarter sawn material shrinks more tangentially than flat grain material of the same size and species. But the quarter sawn material is subject to much less defect such as cup, warp, and check, in seasoning. For this reason quarter sawn larch should give satisfactory results in inside flooring when properly kiln dried to about 5%. The size of the piece changes only as the moisture content changes.

3. Western red cedar, being a light wood and subject to a low degree of shrinkage should be a favored wood when the use is limited by excessive shrinkage. White fir shrinks more tangentially than any of the other species studied. White fir should not be used whenever the material is subject to much change in temperature and humidity, and shrinkage would be a limiting factor in its use.

4. Present improved methods of kiln drying are to be preferred over air seasoning, whenever the extra cost is justified by the improved quality of the kiln dried product. More uniform conditions are obtained by oven treatment.

5 Record, S. J. Loc. cit.
6 Koehler, A. The Properties and Uses of Wood. 1924.

FORESTERS HEAR NOTABLE SPEAKERS

By CLARENCE C. OLSEN, '26

The School of Forestry was exceptionally fortunate the past year in the number and the prominence of visitors who spoke to the School as a whole, to individual classes and at meetings of the Associated Foresters. The roster of speakers includes nationally and internationally-known figures and many others, with smaller fields perhaps, but who are authorities in their own lines.

The first address of the series was given on the opening day of the year by Mr. Huntington Taylor, general manager of the Rutledge Timber Company. Mr. Taylor spoke in particular of the qualities which enable young men to succeed in the industries. He also emphasized the importance of forestry, and the opportunities it affords to young men for a useful career. In view of the success of this meeting, the plan of having an address by a prominent lumberman on the opening day of each succeeding new year will be made a tradition.

Geo. M. Cornwall, editor of "The Timberman", spoke to the Associated Foresters on October 3, on the outlook in forestry and cited the growth of forestry in the south. One particular thought he left was that in that region banks more readily loan money on timber lands if these lands are being kept in a condition of continuous forest production

Within the same month, D. A. Shoemaker, Inspector of Grazing of the Washington, D. C. office, paid us a short visit, during which he discussed several forestry matters, with particular reference to grazing problems. At a Xi Sigma Pi luncheon, Mr. Shoemaker spoke

of grazing legislation and answered many questions raised by those attending.

Early in November, Dr. Raphael Zon, famous forest economist and director of the Lake States Forest Experiment Station at St. Paul, Minn., was with us for a series of lectures. His first talk, "What is a Forest?", which was illustrated, was given to the entire School. He discussed utilization in the Great Lakes region with the class in management and at a Xi Sigma Pi meeting, gave many personal references to forestry problems which are confronting the country at large. Through the courtesy of Sigma Xi, which he addressed upon the subject of "Forestry as a Science", the foresters were enabled to hear him another time. It was with extreme regret to the foresters that Dr. Zon could not remain longer.

Movies started the day of November 16 for the Forestry School, when R. L. Jensen, representative of the John A. Roebling Sons Co., gave a lecture upon the manufacture of wire rope, in which he used a film giving all of the steps through which their product went before emerging in final form.

Director R. H. Weidman and associate silviculturist H. T. Gisbourne of the Rocky Mountain Forest Experiment Station, visited us on the following day. They spoke to the School in the morning relative to experiment station work and again in a reminiscent vein of forestry matters at a luncheon during the noon hour. In the afternoon they spent some time in the School Arboretum, and pronounced it a splendid success. It was at the time of their visit that arrangements were made for the senior class in management to spend two weeks in the field, at the Priest River Branch of the Rocky Mountain Station.

On November 23, Albert Hermann of the Western Pine Manufacturers' Association addressed the Associated Foresters on methods of kiln-drying of lumber. Being absolutely familiar with his subject, Mr. Hermann was able to give an interesting account of studies in this field, as well as of other studies in which his organization is engaged.

Two former Idaho students were with us on the 16th of December. E. H. Myrick, ex-'17, Supervisor of Lewis and Clark Forest at Choteau, Montana, talked to the Forest Club on opportunities in the Forest Service, and he and J. P. Drissen, '21, now in the Indian Forest Service in New Mexico, recounted experiences in forestry work since leaving Idaho at a Xi Sigma Pi luncheon.

At a meeting of the Associated Foresters, on January 27, Dean F. G. Miller reported the meeting of the Western Forestry and Conservation Association held at Victoria in December; Dr. E. E. Hubert discussed the conference at Missoula in January to consider matters pertaining to forest investigations; and Professor H. I. Nettleton told of the Pacific Coast Logging Congress held at Seattle. Dr. Charles S. Crandall, horticulturist at the University of Illinois, who was a guest on the campus at the time, narrated several experiences in forest studies which he conducted in Colorado, before forestry was receiving the attention that it is at the present time.

Dr. C. A. Schenck, once director of the Biltmore Forest School and now of Darmstadt, Germany gained the overwhelming admiration of the students on his first appearance here. He was with us for several days, during which time he covered a multitude of subjects with characteristic forcefulness. At a meeting of the entire School, he compared Europe and American forestry; in the classrooms he discussed many phases of forest economics; at a Xi Sigma Pi meeting, he spoke of the outlook in the forestry profession, and at the Forestry Banquet, on the 16th of February, he ranged far and wide in a running review of forestry developments, interspersing his remarks with many humorous allusions to personal experiences. The morning of February 17, he delighted the student body and faculty in a masterful address at the University Assembly. It is needless to say that Dr. Schenck's visit inspired a greater interest in forestry on the part of everyone who was so fortunate as to hear him.

Fred Morrell, District Forester of District 1, at Missoula, Montana made his initial appearance at the annual banquet, speaking on the topic of "Forest Playgrounds". He spoke on various economic phases of forestry to the assemblies held by the Forest School during the ensuing two days, paying attention to the management of national forests and to employment. As in the case of Dr. Schenck, we gained new inspiration from the talks of Mr. Morrell. Xi Sigma Pi had the pleasure of entertaining Mr. Morrell at luncheon, where he talked entertainingly of personal experiences in forestry.

Supervisor C. K. McHarg of the Coeur

d'Alene National Forest was with us from February 23 to 27 and gave a series of instructive lectures on the management plan for his forest. Mr. McHarg gave an especially clear-cut talk to the members of Xi Sigma Pi on the opportunities in the forestry profession and of the qualities necessary to success on the part of those newly entering the Forest Service.

On March 15, Wolford Renshaw, '25, deputy state forester, narrated experiences in enforcing the Idaho fire laws and of forest conditions throughout the state as they pertained to his office.

Among other visitors of note during the year, but whom the Associated Foresters were not so fortunate as to hear were A. W. Laird, general manager of the Potlatch Lumber Co.; A. D. Decker, land agent, Potlatch Lumber Co.; A. W. Cooper, secretary-manager of the Western Pine Manufacturers' Association, Portland, Oregon; Supervisor Paul A. Wohlen of the Clearwater National Forest, Orofino, Idaho; Hon. Lloyd A. Fenn, Kooskia, Idaho, and Herman Bauman, '24, forester to the California Fruit Growers' Supply Co., Susanville, California.

THE SECOND AMERICAN FOREST WEEK ESSAY CONTEST

By H. I. NETTLETON

As a special feature of the 1925 American Forest Week Program, the Associated Foresters of the School of Forestry, University of Idaho, sponsored a statewide high school essay contest. Cash prizes, totalling $30.00 were offered for the best three essays on "Why Idaho Should Perpetuate Her Forests". Honorable mention was given to the winners of the fourth, fifth and sixth best essays.

The response to this first contest was so satisfactory that the North Idaho Forestry Association agreed to sponsor a second contest during the 1926 American Forest Week program. The subject chosen was "The Relation of the Forest to the Farm". All regularly enrolled high school students, not exceeding eighteen years of age, were eligible to enter this contest. Essays were not to exceed 2500 words in length.

Approximately one hundred students entered the contest, representing high schools from every section of the state. The task of the awarding committee was, by no means an easy one. The essays were graded on the basis of number and application of forestry facts presented, on a knowledge of interrelated farm economics as indicated, and on the general appearance, readability and use of English.

Miss Margery Stock, of Fielding High School, Paris, Idaho, won first honors and a cash prize of $15.00. Miss Stock has just finished her second year of high school work, and according to her instructors, has made a splendid record, being very scholarly in her work, and a young lady of high ideals and splendid character.

Miss Stark's essay is given elsewhere in this edition.

To Miss Vella Eglestou, representing Kamiah High School, went second honors and a check for $10.00. Miss Egleston is strictly a Kamiah product, having attended the Kamiah schools from the lower grades. She plays the piano, sings soprano and plays basket ball in addition to her scholastic achievements. Miss Egleston was graduated on May 18th.

Miss Ruby Thenon, wearing the colors of Kooskia High school, won third honors and a check for $5.00. The winning margin between Miss Egleston and Miss Thenon was exceedingly close and necessitated an extra session of the awarding committee. Miss Thenon has two more years at Kooskia.

From Moore, Idaho, came an essay by Miss La Von Crawford which won first honorable mention. Miss Crawford was also graduated this spring with honors, being valedictorian of her class. In common with her sister contestants, Miss Crawford has been highly recommended for her scholarship and readiness to accept responsibilities while in school.

Second honorable mention went to Miss Florence Auxier, a junior in the Meridian High School. Miss Auxier ranked among the first six contestants in the 1925 contest and has another year before graduation.

Miss Georgia Zumwalt, a junior in the Moscow High Schools won third honorable mention. Her contribution won a place by its originality.

These contests are awakening a wider interest in forestry and its relation to the State of Idaho, and it is sincerely hoped that an even larger enrollment will feature a possible repetition of this contest next year.

THE RELATION OF THE FOREST TO THE FARM

By MARGERY STOCK
Fielding High School Paris, Idaho
First Prize Winner in American Forest Week Essay Contest.

Dear Friends:

I am a tree—an Idaho tree—growing in a national forest. Foresters have often built their camp fires under my protecting arms, and talked far into the night of things that interest me strangely. Last summer a group of farmers, with two professors of agriculture, spent two weeks hunting in the forest and pitched their tents in the shade of my fragrant boughs. From them I learned surprising things. This information together with things that I have seen have inspired me to talk to you citizens on a subject that concerns you vitally, i. e., the relation of the forest to the farm.

As I have said before, I live in a national forest. It is situated in eastern Idaho in the Rocky Mountains. They, with the Bitterroot Mountains, form the eastern boundary of Idaho and are commonly called the continental divide and water-shed. I suppose you are wondering what a water-shed is. The peak which is my home has an elevation of over seven thousand feet, thus the moisture laden clouds from the Pacific Ocean cannot easily pass over without losing their moisture. These forest-covered mountains, with the aid of the humus and interlacing roots, hold the water and are called a water-shed. The rain is welcomed by us as it aids our growth and we hold it among our roots and let it seep gradually to supply the surrounding grass-lands and streams.

The Snake River has its beginning in this vicinity. By means of reservoirs and dams the water is saved for irrigation. Idaho has a greater irrigated area than any other state in the Union. It is estimated that it has two and one-half million acres. In 1919 the capital invested in the whole enterprise was ninety one and one-half millions, and the products raised were valued at seventy seven millions of dollars. Since Idaho is situated entirely on the western slope of the Rocky Mountains, we supply it with water held in storage by our roots. More than one-third of Idaho is forested and 80% of this area is included in the national forests. I am a part of these national forests and it furnishes me, as well as the other trees, a great deal of protection, as we are not allowed to be cut until we are mature. The land, then, should not be cleared entirely as the clearing endangers the cities below by letting the rainfall wash down the mountain side without anything to stop it.

The Snake River is the great river that we help supply with moisture. It drains seven-eighths of the state of Idaho and is the largest tributary of the Columbia River. Many dams and reservoirs are constructed in and near it to save the water. The Arrowrock Dam is one of the largest in the world. From the consideration of these things we see that farming is very extensive. The wheat counties are Latah, Nez Perce, Lewis and Idaho. There are approximately twenty-five millions of dollars worth produced annually. Oats are raised mostly in Fremont and Twin Falls counties, with an annual production worth nearly seven millions of dollars. Barley is raised extensively in Nez Perce, Lewis and Idaho counties. The value is estimated at five million dollars annually. The worth of the hay crop grown mostly in Canyon, Twin Falls and lincoln counties is estimated at thirty-five millions of dollars. In fact this is one of the most important crops. The value of the annual potato crop is five million dollars. This crop is principally grown in Twin Falls, Bonneville and Bingham counties. Boise and Payette counties produce much fruit. There are approximately one million five hundred thousand bushels of apples produced annually, one hundred and fifty thousand bushels of peaches and seventy-five thousand bushels of pears. Forty thousand tons of beet sugar are refined annually. This, then, is the value of the forest to the farmer as a moisture supplier in Idaho, and what is true of this state is equally true of many others in these grand United States of ours.

We, the forests, serve as a summer pasture for live stock and especially sheep. Both of these are of vital importance and closely related to the farmer. The milch cows furnish the farmer milk, butter and cheese. In 1912 thirty-six butter and cheese factories were reported in operation. The farmers, although not the possessors of these large herds of

sheep, are benefited directly or indirectly by them. They use the meat on their tables and use the wool for their clothing. The value of the sheep shipped for mutton and of the wool shipments amounts to over ten millions of dollars annually. Many draft horses, also, graze here. These, the farmer uses in working his farm. Thus the forest aids the farmer in his work and in supplying his food.

There is much need for lumber and trees in all of the farmer's enterprises. He uses lumber to build his home, his fences, his barns, machine sheds, and store houses. The national forests are operated in such a way that lumber is cut wisely and without harm to the forests. Furthermore the forests, both state and national, benefit the community in which the farmer lives. Two funds, the "Forest Development Fund" and the "Forest Highway Fund", are appropriated for the building of roads and trails within and to the national forests, the trails within being a means to protect the forests against fires. Besides these funds, there is an annual payment to each county having national forests of twenty-five per cent of the gross receipts for the support of the common schools. The state also supplies funds for these purposes .

The farmer receives many useful and necessary things from the forest. The rubber trees supply him with boots, rubbers and tires for his "Tin Lizzie." Turpentine, another forest product is used for cuts and sores and forms an important ingredient in the paint which preserve his sheds, machinery, furniture and home, and makes them attractive. The paper on which he writes and the newspaper which he reads is made from wood pulp. It is estimated that six acres of spruce timber are required to furnish sufficient paper to publish the Sunday issue of a metropolitan newspaper. From this he gets his information about crops, markets, social and weather conditions and many things pertaining to the farm. The books from which his children secure an education are partially forest products. The different trees can be used for fire wood. Thus we, the forests, furnish many useful products for the farmer.

The visitors who come to the forest for recreation and sport are many because we shelter the wild animals and serve as a protection to them. There are also many streams protected by us which are the homes of fish, and the people often come to catch them. Though some men are our enemies, I still feel safe in living in this national forest and have found many friends.

Only today I had a forester say that seven percent of the forest land and nearly thirty per cent of the timber is owned by private citizens and that at the present rate of cutting this will last only about thirty-five years. We cannot hope to supply Idaho with timber even with the aid of the state forests. I appeal to the people to study not only us, but all of the trees, and cut their timber wisely so that the supply of timber will increase instead of decrease.

Our greatest enemy is fire. Left burning by careless visitors, it consumes us ravenously. Can't you give us more protection?

I love to live in the forest and meet many people who inspire me to tower still higher and be as useful as possible to the farmer and to everyone. I like the music that the wind plays on my needles and I like the shifting rays of the sun. We try to awaken in men ideals, thus inspiring them to do better. Many poets and great men have been inspired by us and by our ancestors. Homer, the Greek poet, loved nature; Abraham Lincoln enjoyed her beauty; Roosevelt found his recreation amid her charms. As the three main things in order to live are food, shelter and clothing, the forest aids either directly or indirectly not only the farmer, but every human being.

A PLAN FOR EXTENSIVE SURVEYS IN REMOTE REGIONS OF IDAHO

By CHARLES E. FOX, '27

This article is written for conditions such as are found in the more remote districts of Idaho. Some of the ideas herein set forth might be applicable in any part of the country where the forest region is rough and inaccessible. These two qualifications, rough topography and inaccessibility, are fundamental to the understanding of this report and the limits thus necessarily imposed must be continually in the mind of the reader.

METHODS

Control

In determining the system to be used in running the control, so many factors enter into consideration that they will not be discussed in detail here. The method to be used should be such that results are within the limits of error commensurate with the degree of accuracy observed in all other parts of the survey. If a very accurate survey is to be made, good maps are needed, and if they are not available the control must be run with a transit. If less accurate work is allowable, a compass and chain would suffice. In order to save all the time and money spent in actual running control, available maps should be carefully checked, and if they are acurate enough for the work, they should be used.

Purpose

Very little is known concerning many of these remote regions. The districts are large, the topography forbidding, and consequently few of the forest employees leave the main trails. Inaccessibility prevents recreationists from wandering very far from the beaten path. Consequently, when some sort of report is necessary, very little is actually know about that which is on the ground. Frequently the timber survey serves as the basis for management plans, when the forest is placed on a sustained yield basis. This use of the survey is ever increasing and is becoming the chief objective in many cases.

Class of Survey

Ordinarily the region will be so situated that many years will have passed before it becomes of great importance commercially. Thus an extensive survey is in order. It must cover an enormous area in a comparatively short time, it must give a great deal of information and it must be cheap. The problem now narrows down to the obtaining of data in great masses, on a large scale. Obviously, the percent of estimate must be small—five percent or below. In fact, we may almost say that five percent estimate is certainly too high because the cost is too great and since the other elements of the survey are on a less accurate basis, such an estimate is not justifiable.

Field of Survey

What factors other than the timber estimate shall be included? This brings us up to the problem as to which is the more important, a timber survey with stress on the timbered areas, or a fire survey emphasizing burned areas for purposes of computation of future yields and values. There are enormous burned areas on the national forests in Idaho and there is no doubt of their importance. Therefore, if the area to be surveyed is one where logging is the chief consideration, the timber survey should receive greater weight and if the area is largely burned, where plans must be formulated for many years in the future, the fire survey should occupy the important part of the reconnaissance.

At any rate, there should be information on drainage, topography, soil, timber, burns, grazing, fire hazard, reproduction, transportation facilities,logging chances, and recreational possibilities. The best way to organize this collection of data seems to be through a combination of field map and write-up.

Those features which can be better mapped than described in words should go on the field map, as this makes for simplicity and clearness. Care should be taken that too much information is not crowded into the field map or a meaningless jumble is bound to result. Under this system at convenient times during the season, say every three weeks, the field maps are transferred to office maps which are the basis for all final maps, graphs, tables and compilations.

Size of Crews

If speed is imperative, two similar parties will make the survey, but if funds are tight, one party will be used and the work distributed over a longer period of years. Seldom should there be more than 5 men in the party including a chief, a packer, cook, and three estimators. In ordinary extensive work it will be found that with five men, camp will be moved every two days, and in the more extreme cases every other day, or every three days.

Per Cent of Cruise

When one comes to decide upon the percent of cruise to be made there are a great many factors which should be taken into consideration—so many, in fact, that they cannot be discussed here. It will suffice to say then that the following arrangement might be practical and satisfactory for this kind of a cruise. There should always be two lines through a section. In order to facilitate the use of one-man crews the circular plot method should be employed. These plots should be ¼ acre in size (59 foot radius) and should be

estimated along these two lines through each section, being spaced according to the commercial value of the area. When there is enough merchantable green timber in a section to justify a more careful estimate there should be a 2½ percent cruise, otherwise it should be 1¼ percent.

Guides to the Survey

Points to be remembered in connection with the estimate are:

1. Ocular method of estimating is to be used on both diameters and heights.
2. Estimate trees 12" and over D B. H.
3. Estimate heights to nearest ½ log length (8') to an 8" top.
4. Check log length by pacing windfalls.
5. Run strips at right angles to the drainage when possible.

The chief should keep in touch with the nearest ranger, so that the available fire-fighting force is increased. This he usually does by using an emergency phone which can be connected to any woods line encountered and calling in thru the employment of a "howler" at the ranger station. The party of course, is always supplied with fire-fighting tools and emergency rations.

CAMPS

It is altogether proper that some space be here devoted to the subject of camps, inasmuch as the average survey crew will make and break camp some 25 or 30 times during the course of a summer season.

Locating the Camp Site

It should be the duty of the chief of the party to pick the location of the camps since it is his responsibility to see that all sections are surveyed, and reached as easily as possible and that camps are satisfactorily located with regard to the lines which are to be run. The chief should know approximately where his camps must be for several weeks ahead and plan his work and the packers' trips for supplies accordingly.

The chief should plan the work so that few, if any, side camps are necessary. Except in rare instances these one-and-two-day back-trips can be avoided with a little careful manipulation of camping places.

The Camp Site

A camp should be located in such a way that in returning from running a line, an uphill climb to camp is avoided. This necessitates the location of camps in lower country, from whence lines are run uphill with a consequent downhill trip into camp after the day's work. However, as most camps are near the tops of ridges, where travel with stock is easier, this more or less ideal condition is seldom realized. A level place, near water and wood, is also necessary, but the presence of stock feed near at hand should be among the first considerations.

Without sufficient grass the stock cannot be held. A delay is liable to result while the packer makes a trip after them and thus the packer and everyone loses time and temper. Stock that are easily satisfied and seldom run away are a blessing indeed. This point in regard to stock should also be borne in mind—they will invariably return over familiar trails, and so they should be kept "above camp" where possible, and when they try to go back over the trail traversed recently, they can be shunted back into the new country from which they are unlikely to venture, unless feed is especially poor.

A camp should be so located that one has to walk no more than five miles to a line. This should be the absolute maximum. The chief must remember to make his plans so that adjoining sections out of reach from one camp will be within range of some future camp.

MAPS

Number and Kind of Maps

Ordinarily, it will be found that all of the necessary data can be shown clearly enough by the use of three maps—the drainage map, the silvical map, and the hazard map. If more importance is to be placed on other features, such as grazing, lookout control, logging, or management, these may be shown on separate maps or in combination as is desired.

1. The Drainage Map

Lightly drawn lines, with arrows, should represent the trips through the section. Using the control map as a basis, the details of the drainage for the whole section should be filled in by sketching in all creeks estimated to be carrying water the year round at the time they are crossed or observed. The complete drainage should be sketched to edge of section, and one should be sure to put the names on all larger streams with arrows to represent direction of flow. Trails should be sketched to edge of section, good trails with dashes thus ------and poorer trails with dots................, also cabins, lakes, ponds, ranger stations, lookouts,

smokechaser camps, etc. Show with hachures all important peaks, ridges, saddles and passes.

2. The Silvical Map

This map shows the boundaries of green timber, burns, meadows, and barren areas with solid lines. On this and on the hazard map no areas under 160 acres are mapped.

a. Green Timber

The green type should be labeled "Gr" and should show the species and age-class as per the legend. For example: $\frac{\text{SP-V}}{\text{AF-M}}$ denoting a spruce-alpine fir type dominated by spruce (since it is the first named), the spruce being over 180 years old (Veterans) and the alpine fir 120-180 years old (Mature).

If it is a pure stand only one species would be noted and if a mixed stand more than one species as in the example, but never more than three species are to be considered, and they are always named in order of predominance of volume in the stand. This also applies to reproduction in burns.

b. Burned Areas

The burned type should be labeled "Burn" with the year of the burn as approximated by observation. In this connection, I might say that it is well to be fully acquainted with the big fire years of the past to facilitate the use of a good background for these approximations.

c. Reproduction Plots in Burned Areas

The burns are roughly classed as either reproducing or non-reproducing. This classification is based on tallies of reproduction plots every ten chains on the line through a burn. These plots are best taken by counting the number of seedlings and saplings by species on a plot approximately 21 feet square. Multiplying the count for each species by 100 gives the average number per acre for that species.

If there is a total of more than 200 seedlings and saplings per acre on a certain burned area it is classed as reproducing, and if fewer than this number are found it is non-reproducing. If reproducing, the species are noted on the maps as in the case of timber, in order of predominance, with the number per acre and the age class which always will be in or immature (0-60 years old). If not reproducing, the burn is simply labled NR.

Meadows over five acres in size should be mapped for the convenience of travelers and labeled Md.

d. Barren Areas

The barren type is of such a nature that trees find it impossible, or at least extremely difficult to grow there and is not to be confused with non-reproducing areas where the soil is such that seedlings should flourish. The type is usually found at the higher, rugged situations. On the map it is labeled Br.

3. The Field Hazard Map

This map roughly shows the fire hazard on various parts of the section. The fire hazard is either low, medium or high, depending upon the inflammability or fire risk. Green and barren types are always low hazard. The inflammability of burns must be left entirely to the judgment of the estimator. No satisfactory basis has yet been determined, although from observation, I would say that burns over 15 years old are a low hazard, burns 6 to 15 years old a medium hazard, and burns which have occurred during the last 6 years, a high hazard.

AVERAGE COSTS

Three months season. Figures based on survey on Lochsa district, Selway National Forest, 1925.

Salaries

Packer @ $100 per month	$ 300
One Estimator @ $75	225
One Estimator @ $80	240
One Estimator @ $85	255
Chief of Party @ $110	330
Total Salaries	$1350

Food

5 men, $1 per day each, total	$ 450
Total cost for season	$1800
Total cost per day	$ 20

Summary of Time

Cruising, 32 days	$ 640
Moving, 23 days	460
Fire, 6 days	120
Moving (fire), 8 days	160
Delays, 4 days	80
Maps, 5 days	100
Sundays and Holidays, 12 days	240
Total cost, 90 days	$1800

Summary of Costs:

Total miles ran (lines) 154

Cost per mile $11.68

Total number sections covered 285

Cost per section ....$ 6.31
Total miles moved 225
Cost per mile ....$ 2.04
Total number acres cruised 182,400
Cost per acre ....$ 0.0098
(Practically one cent per acre)

IDAHO'S TIMBER TAX PROBLEM

(Continued from page 4)

of handling lands that are acquired through tax delinquencies by the counties puts an end to the possibility of county management of timber lands—the counties are only too glad to divest themselves of title so that some revenue may be directed to the treasury by having the lands placed on the tax rolls. In the case of cut-over lands thus secured it means that the county would have to sell them, time and again at tax sales as they revert, without any appreciable financial receipts until such time as the investor could see a reasonable chance to profit by the purchase, and this condition would not arrive until the reforested area showed itself to be covered with an age class of timber well toward maturity.

Timber, like ore. has no tangible economic value until severed from the freehold. It is only at the instant of severance that the owner has any chance to secure a market for his product, the condition which makes the timberman's property of tangible or taxable value. Here then is created a property which is subject to valuation and properly liable to taxation for its intrinsic worth. Without reaching a state of personal property the timber can not be segregated from the realty which has a value only for the purpose to which it is adapted or used.

When considering the similarity of the mining and timber industries as tax paying propositions it should be borne in mind that the ore in place suffers no deterioration while the timber, if allowed to remain unharvested soon dies of old age and becomes lost as a revenue producer. Also, once the ore is withdrawn from its depths it is forever lost as a revenue producer, but the timber under proper management reproduces and continues its revenue producing value indefinitely. Hence it would seem that a severance tax on timber has even more justification than one on ore for the reason that timber is capable of production while a mine is not, and would thus afford a cycle of taxing values for all time.

Equitable taxation is in a large measure a matter of education. In the state where there is no established policy of disposing of public lands and especially where the mine tax system as used here is not in vogue it would be a rather difficult thing to secure legislative action in line with the thought expressed in this article, but in Idaho where these things are well known to the citizens and in a very large degree appreciated the situation is not so terrifying. It is but a step from the mine tax system to the severance and surface tax idea for the forest.

Compelled as the writer is, to devote his thought to the question from a layman's viewpoint, there is no entrance here of the technical features involving formulae. Such consideration must be left to those qualified in their profession, but once the idea prevails that Idaho can well afford to adjust its system to meet the commutation, land value, and severance tax theory our problem may well be scrutinized by those versed in the multitude of issues arising in forestry itself.

The admirable forest law passed at the last session of the legislature is going to have a far reaching effect upon the adjustment of our present method of handling timber tax The law will bring forth the need for greater care of the forests to the public mind and thereby influence the tide in favor of a more general consideration of the problem. True it is that the present forest law will need revision and so would it be with the initial forest tax law as here advocated but time and experience will cure the defects in any legislation inaugurated.

Another very pertinent factor in the hastening of the time to a revision of our present method of assessment is the ever increasing inroads upon our virgin stands by the lumberman, in that it results in a loss in revenue to the taxing unit because of low assessments on cut-over areas. Alarming conditions are arising in various parts of the state and legislation is going to be demanded by the general tax payer in self defense.

ENGINEERING ASPECTS OF FORESTRY

(Continued from page 7)

for breeding and winter protection for many of our wild animals.

Engineers, and agricultural engineers in

particular, have therefore a distinct field, an obligation to discharge, in the preservation and better utilization of the forest.

The remarks by Dean Cooley, of the Department of Engineering at the University of Michigan, express this thought much better than I could possibly do. In a letter to President Hartness of the American Engineering Council, he says:

"It has been one of my ambitions to do something worth while in reforestation. I consider it the most vital factor in the future welfare of the country. Looking into the future no further than 75 or 100 years I can see conditions arising, if our cut-over lands remain barren, which will make it very difficult if not impossible to live in this north temperate zone of ours—certainly not in the way we are now living. The price of coal will have advanced beyond what the ordinary man can pay; and the streams which can produce 50 million horse-power will have become filled with earth and silt washed from the watershed to such an extent as to partially or wholly destroy them for power purposes. .... And he (the engineer) could do so much if he would. And he will, I am sure, when finally aroused to a sense of his responsibility. I have faith in the engineer—absolute faith—that when aroused he will see the way, dark as it is, to bring to bear a protective hand as great as his creative hand is now. If the engineer and all the name implies, fail the world, what must the writing of the future be for ours, the greatest of all civilizations we know aught of?"

SOME PRINCIPLES TO GUIDE THE MARKING AXE IN WESTERN YELLOW PINE IN THE NORTHWEST

(Continued from page 11)

medium height and pyramidal crown, with a good root anchorage and with the center of gravity, so to speak,, nearer the ground than the top.

Regarding Poor and Rocky Sites

Over a large part of the region, the yellow pine type often contains extremely rocky areas, sometimes 15 or 20 acres in extent. Usually these are in the form of broad ridge tops covered with open stands of timber. Although the timber is shorter it is often straight and of large diameter, with one or two good saw logs per tree. It has been the custom on many timber sales to mark such areas when they are encountered. Frequently the markers discuss the silvicultural advantages to the site of leaving these trees, regardless of merchantability, but unconsciously they are guided by the desire to get a cut. Thus, the trees on these sites, if they are merchantable, are practically always cut. Such rocky sites in their present condition of open forest cover are properly protection sites. What few trees are on them, no matter what their age, should be left there to build up forest conditions. The stumpage from such areas is extremely low, whereas the value of the trees to the site is immeasurable. They keep on seeding, they hold moisture in the soil, and they build up the site.

In some parts of the region, there are occassionally very steep ridges composed of loose morainal soil. The yellow pine cover here becomes open and the trees short, possibly containing 2 to 3 logs. There is very little or no ground cover on these steep slopes. Here also trees that could possibly be considered merchantable were marked. And here, more than any where else, the site demands leaving everything, particularly on the south slopes.

Instruction and Inspection

The local timber marker is usually the first man to admit a need for instruction and to express a desire for it. Printed marking rules, no matter how good they may be, do not alone serve in the way of instruction. Nor do the brief inspections from the District office, necessary as they are, serve as instruction. Least of all does an inspection memorandum serve the purpose. The best way of carrying on instruction is for a competent District officer to make the rounds of the timber sales each year and to mark—axe in hand—side by side with the markers on each sale. By spending a week in this way with the timber sale officers of the national forest, the greatest good can be accomplished in interpreting instructions and explaining the principles underlying them. It may be pointed out, also, that the instruction is not entirely one-sided. There are always different problems coming up on the sales which will be new to the District officer. Also, there will always be the viewpoint of the field man who lives the year round with his problems. Whenever it can be arranged the trip of the District officer to the larger timber sale forests, at least, should be

made in conjunction with the forest entomologist and forest pathologist.

Aside from learning from others, there is much that the marker can learn for himself, much that he can learn directly from the forest. Indeed, if he is connected for several years with the same sale or sales, he has an excellent opportunity for doing a little individual research. He can, for example, note down observations on the diameter at which trees begin to seed effectively. This will be indicated by the number of old cones under the trees. He can also watch the future of trees which he finds becoming infested with bark beetles. He can further observe whether trees of doubtful crowns recover or deteriorate. Such observations as these will not only improve his own marking, but will add materially to the sum of marking knowledge.

April 14, 1926.

THE TREND OF FOREST FIRE RESEARCH IN NORTHERN IDAHO

(Continued from page 18)

dition to-morrow, or next week, or next year. Manufacturers, wholesalers, and retailers of silk shirts found that out with financial emphasis when an unprecedented demand for their product suddenly collapsed to an almost negligible quantity following the World War. Many men engaged in forest protection have learned the same lesson to their sorrow, when a nice quiet spell with no fires suddenly changed to an epidemic of raging infernos. In this case the possibility of the sudden change might have been anticipated either by knowing correctly the degree of existing dryness or by forecasting fuel moisture content and causes of fires a few days ahead.

In forecasting forest fire danger two separate predictions are necessary. First, the fuel moisture content, hence inflammability, and second, the activity of the causes of forest fires. Will the fuels burn, and, will something start them burning?.

The weather, of course, controls changes of fuel moisture content. Hence forecasts of rain, humidity, temperature, wind, sunshine, etc., must be available and we must know how each of these elements affects fuel moisture content before we can predict it. Weather forecasting is the field of the Weather Bureau; our first research has concerned itself mainly with the effect of the weather on the fuel moisture contents. With the 36-hour weather forecasts available at present we have been able to predict the degree of inflammability of fuel, the top duff, 36 hours ahead with very satisfactory accuracy. Gradually this work must be extended to include forecasts of the degree of inflammability of the other fuels as well as the duff.

In predicting the activity of the fire-starting agencies we are making progress principally in the study of lightning storms. Approximately 175 fire lookouts, stationed on the higher mountain tops in this region, fill out report forms on every lightning storm within their range of vision during the fire season. Records have now been obtained covering four successful seasons and it is hoped ultimately to obtain from them much valuable information pertaining to the time and place of occurrence, the direction of movement, and the characteristics of the dangerous and non-dangerous storms, such as amount of rain and lightning, which will be of value in forecasting lightning-caused forest fires. Practically no work has yet been done in attempting to predict the activity of the other common causes of fire.

With measurements of the degree of inflammability prevailing at any time, and forecasts of this condition several days ahead, and with added knowledge of when to expect the fire-starting agencies to become active, it should be possible to construct a more flexible forest protective organization which will be better able to supply adequate protection at minimum cost. The present trend of forest fire research in Northern Idaho is the discovery of facts and methods which will contribute to this end.

A REPORT OF A COTTONWOOD STUDY IN SOUTH IDAHO

(Continued from page 22)

are secured from trees cut in the winter and early spring. As soon as they are well developed the best from each stump should be selected and the remaining sprouts should be cut back. Stock should be kept out of reseeded or sprouting areas for the first three or four years, to prevent browsing of the young seedlings. In order to give the greatest possible amount of light which is so necessary

for the development of a second crop, all undesirable species should be removed at the time of logging to make room for the residual trees and the new growth.

One possible solution to the transportation problem, so far as the present local mill is concerned, would be the spring rafting of winter cut logs from the up-river areas, with water storage at the mill until the logs are needed. Such procedure should be entirely feasible, especially since the best stands of pure cottonwood are next to the river and often inaccessible to trucks.

No rotation period of cutting has been worked out for the project, due to the fact that so many different land owners are interested in this timber that concerted action would be practically impossible. Figures given in this report should indicate, however, that the cottonwood stand of the Wood River Valley is a real asset, rather than a liability, and it is sincerely hoped that this report may at least awaken a keener appreciation of a tree which is at present considered by many to be a liability and nuisance rather than a potential source of income.

Senior Class, 1926, School of Forestry, University of Idaho, Moscow, Idaho

Left to right—Valentine Sajor, Cabugao, Ilosos Sur, P. I.; Collis H. Huntington, Attica, N. Y.; Eugenio de la Cruz, Lingayen, Pangasinan, P. I.; Harold Z. White, Moscow, Idaho; Lawrence R. Pugh, Springston, Idaho; Walter D. Field, Huston, Idaho; Clarence C. Olsen, Seattle, Wash.; Warren H. Bolles, Little Valley, N. Y.; Ivan S. Doyle, Moscow, Idaho; Fairly Walrath, Orofino, Idaho; Norman F. Gillham (Photo not shown) Edwardsville, Illinois, is also a member of this class.

Bolles, Olsen and White took the junior forester examination, U. S. Forest Service, and all passed. Sajor passed the examination for range examiner These four are the only members of the class taking the civil service examination, but all of them passed with credit to themselves

Bolles has accepted an appointment with the U. S. Forest Service and will have charge of a reconnaissance crew on the Idaho National Forest. Olsen will take an appointment in the Forest Service, and will be located in Oregon. Huntington has taken an appointment at the Priest River Forest Experiment Station. Doyle, Field, Walrath and White have entered the employ of the Clearwater Timber Company, Lewiston, Idaho. Gillham will be employed in a sawmill at Phoenix, Arizona. Cruz and Sajor will enroll for the master's degree at the Yale Forest School next fall. Pugh will engage in the lumber business as salesman with the firm of Russell and Pugh at Springston, Idaho.

SENIOR FIELD TRIP

CLARENCE C. OLSEN, '26

Early in the spring of 1926, it was arranged, through the courtesy of Director Weidman of the Northern Rocky Mountain Experiment Station, that the seniors of the School of Forestry spend a period of two weeks at the Priest River Branch, situated in the Kaniksu National Forest. Accordingly, a party consisting of Dean Miller, Harold White, Fairly Walrath, Collis Huntington, Lawrence Pugh, Warren Bolles, Ivan Doyle, Norman Gillham, Eugenio de la Cruz, Valentin Sajor and Clarence Olsen left Moscow on May 16, arriving at the station that night, where they were joined a day or so later by Walter Field.

The first day was spent, after meeting the personnel of the station, in getting a proper perspective of the work of the forest experiment stations, through a talk by Mr. Weidman, inspection of sample plots for yield and thinning studies, planting and nursery experiments and a discussion of weather forecasting and duff inflammability by Associate Silviculturist Gisbourne.

On the following day, two crews were formed, one under Mr. Kempff, in charge of the local station and Dean Miller and the others under Mr. Gisbourne and Mr. Haig, also attached to the station staff. The former crew laid out a yield plot in a white pine type and the latter, one in the Douglas fir type. Boundaries were surveyed and marked, trees tagged by consecutive numbers and data on trees in the plot by diameter, species, crown class and height were obtained. On the third day, crews were interchanged between the two types and additional plots were laid out and data secured.

The program for the fourth day consisted of a study of reproduction after fire, on an extensive burn near the station. Along a compass line, trees were tallied as sound, injured, dead and down for every alternate half chain and at each half chain, transects of 1-1000 acre were laid out, upon which seedlings, by species and age class were tallied. Additional notes on site factors and vegetation were taken in the field, and upon return to the station, computations for reproduction percentages and volume of timber by basal area were made. Two crews of three men and an instructor were employed in this study, while the remainder of the group was engaged in laying out a thinning plot.

Class of 1926 in the Field

With crews changed the next day, an additional thinning plot was laid out, all stems were classified by crown class and diameter, trees to be cut were marked and those to be left were banded. Throughout this and all the other studies, instructions were most capably given by the members of the staff and all points not clear were explained. On the succeeding day, tallies of removed trees and trees left were recorded, the actual thinnings made and as much brush disposed of as warranted under existing weather conditions.

The next day, Mr. Gisbourne talked to us

about fire studies and conducted various experiments with smoking materials as causes of fires. Later Mr. Kempff explained the numerous instruments for recording weather conditions, after which an attempt was made by all the party to forecast weather conditions for the following day. In the afternoon, data on the yield plots were "worked up". Space prohibits a detailed account of the computations made. On this evening, the members of the party took a trip to Priest Lake, some ten miles or so from the station.

All the next morning we were engaged in inspection of numerous plots established at various periods and in gaining information showing the relation of fire to humidity. In the afternoon, through the courtesy of the Diamond Match Co., an operation on state land was inspected. We were given an excellent opportunity to witness marking and brush disposal methods (the latter being handled by the Forest Service) and log transportation by live chutes. An excellent meal was provided that evening for the hungry party.

Studies for reduction after cutting were made the next day, on a sale area cut over in 1916, which was situated at some distance from the station. This was similar to the studies made after fire. A very decided difference in reproduction was witnessed on sites where brush was disposed of by piling and burning and on sites where broadcast burning was employed.

A decidedly profitable day was next spent on a sale of the Dalkena Lumber Co. Supervisor Whitham, of the Kaniksu, explained the contract pertaining to the operation, after which he showed us examples of brush disposal and girdling of hemlock. In the afternoon further inspection of the area was made, including sample plots of reproduction studies. Mr. Whitham, Mr. Breen, Mr. McGillivary and Mr. Tracy, forest officials, as well as members of the station staff were very courteous in their explanation of the operation.

We returned, on our last day, to the same operation, where we were given an explanation of the marking rules employed, and of various sale clauses of the contract. Opportunity was offered in the afternoon to mark timber on the sale area under the instruction and supervision of the forest officers. Like all of the other days, this was very interesting and instructive.

Sample Thinning Plot, Priest River Branch Station

Throughout the trip, every opportunity was given us to learn as much as possible. The station staff and the forest officials were courtesy itself. Too much cannot be said for the thoughtfulness of our instructors; for what little work we may have accomplished, we were repaid many fold. Quarters furnished us were comfortably arranged and we were exceptionally fortunate in the choice of the cook who's services were secured for us. On the following day, then, we culminated a trip which was inexpensive in cost and invaluable in experience and returned home in the school truck which had served us well on our trip.

PERSONALS

MARK ANDERSON was recently elected president of the Provo Kiwanis Club, and is also president of the Provo Fish and Game Association. Though no longer a forester by profession, Mr. Anderson has evidently not forgotten his early training for he is working for the cause of conservation at every opportunity.

JESS BEDWELL, who is Assistant Pathologist for the Blister Rust Control work in the Northwest, paid the School of Forestry a visit recently. He was pleased at the rapidity with which the School has expanded, and expressed a desire for closer connection with his Alma Mater in the future.

PAUL BIELER, (R. C.) '21-'22 writes, "I am now Scout Master of a troop of forty boys in Ogden, so I have a big chance to talk forestry. We are helping to arouse interest in a municipal forest for the Boy Scouts."

LEWIS CUMMINGS, B. S. For. '25 recently received a promotion from ranger to junior forester. Since leaving school Cummings has worked on a tie sale, been in the District Office on short detail, and in April was sent to Glenwood Springs where he has charge of a cruising party.

ALBERT DANIELS, B. S. For. '23 writes that he has left the National Lumber and Creosoting Company to accept a position with the Southern Pacific Railroad Company at Houston Texas. He is connected with the engineering department, being chemist in the wood preserving plant.

FRANK DRISSEN, Ex-'27 is employed as a lumber checker for the Tuscor Lumber Company at Tuscor, Montana. He says he is learning considerable about the lumber game and will re-enter the School of Forestry in September.

HERMAN BAUMANN, '24 is forester for the Fruit Growers' Supply Company, Susanville, California. He recently visited the campus for a few days, and praised the new quarters for the School of Forestry very highly. Mr. Baumann was very enthusiastic over the possibilities of forestry in California, and justly so, for the Fruit Growers' Supply Company is practicing forestry on an extensive scale.

JAMES W. FARRELL has been promoted from junior forester to assistant forest supervisor, and transferred from the Idaho to the Wyoming National Forest. Farrell has distinguished himself for his work in connection with timber sales and management plans.

CLIFFORD HUNTER, '27, is employed on the Coeur d'Alene National Forest on timber sale work. He will re-enter the School of Forestry in September.

LES EDDY, Ex-'24, has resigned his position with the Forest Service to take charge of the protection work for the Clearwater Timber Protective Association. He assumed his new duties April 1, and if present weather conditions are any criterion will have plenty to keep him busy this summer.

ART SOWDER, who was a campus visitor recently, would have us believe that he came to visit the school, but—we noticed that his engagement was announced shortly afterward, so are discounting his alleged reasons about 500 per cent. Miss Rose Preuss is the fortunate lady. The Club extends congratulations to these splendid young people.

HARRY MALMSTEN, Ex-'17, is Assistant Professor of Forestry at the University of California. He received his M. F. degree from California in 1922 and has been teaching there since. We notice that Harry is still single; perhaps he believes that man cannot serve two masters.

RALPH ROSS, Ex-'26, says that after school last year he went to sea, but is now "home and much wiser." Evidently the ocean does not agree with "Blease." After this experience he is a confirmed forester, and will re-enter the School of Forestry next September.

"BUNG" SNOW, '25 passed the Junior Forester exam last spring with a very creditable grade, and is now Junior Forester attached to a timber sale on the Medicine Bow National Forest. "Bung" became a benedict shortly after commencement, and like all the others says it's the only life.

WILLIAM BUCKINGHAM, Ex-'26, had planned to be with us this year, but his duties as ranger on the Clearwater National Forest interferred. It is rumored that "Buck" has been promoted ranger in charge of grazing and attached to the supervisor's office. He will probably return next February to complete the requirements for graduation.

TOM LOMMASON, '17 has been promoted to the position of inspector of grazing, and is attached to the District Office at Missoula, Montana. He comes to Moscow quite occassionally and never fails to visit the School of

Forestry. We thought Tom was a confirmed bachelor, but last September his status in this respect underwent a change.

E. H. MYRICK, Ex-'17, paid the School of Forestry a visit last December. He is supervisor of the Lewis and Clark National Forest, Chateau, Montana. Mr. Myrick gave a very interesting talk on the administrative problems encountered by a forest supervisor.

GEO. MADLINGER, Ex-'24, received his M. F. at Yale last year. He is now assistant professor of forestry and engineering, University of the South, Sewanee, Tennessee. His duties consist of teaching three classes in forestry, one in surveying, and the care of 10,000 acres of Southern Appalachian hardwoods belonging to the university.

WM. CALLENDER, '26, has been working in the mines and lumber camps of Idaho. He visited the School of Forestry recently and paid many compliments to the enlarged new quarters . "Bill" expects to re-enter the University in September,

EDDIE NERO, Ex-'23, has resigned his position as Ranger on the Clearwater National Forest, and is now employed in the dry goods department of the Orofino Mercantile Company at Orofino, Idaho.

CHARLES FOX, our esteemed Editor, recently announced his engagement to Miss Dorothy Gorrie. It is rumored that they will be married at the close of the school year.

FLOYD COSSITT, Ex-'24, is Junior Forester on the Selway National Forest with headquarters at Kooskia, Idaho. It is rumored that Cossitt was married last Christmas, but to date no confirmation has been received.

XI SIGMA PI

HAROLD Z. WHITE, '26

Xi Sigma Pi, National Honor Forestry Fraternity, was founded as a local society at the University of Washington in 1908. In 1915 it developed into a National, and began adding new chapters.At present Xi Sigma Pi has nine chapters, located at the prominent and active forest schools throughout the United States.

Epsilon Chapter of Xi Sigma Pi was established at the University of Idaho in 1920, with a membership of seven, two members of the faculty and five students. Since then the number has grown to eighteen, four faculty and fourteen students; and the fraternity can now boast of as large a membership as any other National honor organization of the Idaho Campus.

The objects of the fraternity are to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry, and to promote fraternal relations among earnest workers engaged in forest activities. The ideals of scholarship and leadership in forest activities have always been uppermost in mind in the selection of new members.

In order to stimulate scholarship in the School of Forestry, Xi Sigma Pi purchased an attractively designed bronze tablet, upon which are engraved each year the names of the students who have attained the highest average in each class for the school year. The tablet holds its place with the other gifts to the University on the walls of the main floor of the Administration Building.

The names of the students now engraved on the plaque, and the years in which they attained the highest average of the class are as follows:

1922—James W. Farrell, senior; Russell M. Parsons, junior; Arthur M. Sowder, sophomore; Paul M. Harlan, freshman.

1923—Albert S. Daniels, senior; Ralph S. Space, junior; Paul M. Harlan, sophomore; Floyd W. Godden, freshman.

1924—Rogers G. Wheaton, senior; Robert P. McLaughlin, junior; Floyd W. Godden, sophomore; Henry C. Hoffman, freshman.

1925—Ralph S. Space, senior; Warren H. Bolles, junior; Galen W. Pike, sophomore; William W. Mitchell, freshman.

To be eligible for membership in Xi Sigma Pi, a student must have completed two and one-half years of standard college work in an approved school of forestry. Three-fourths of his grades shall have been above 80 per cent, and he shall not have received any failures in forestry subjects. He shall also have shown a creditable interest and activity in practical forestry work. In the election to the fraternity, a man's practical ability is just as thoroughly considered as are his scholarship attainments, and it is hoped by this means to

stimulate the interests of the underclassmen, thus fulfilling the objects of the fraternity.

The officers of Epsilon Chapter for the year just closing are:

Harold Z White, Forester; Warren H. Bolles, Associate Forester; Mark M. Lehrbas, Secretary Fiscal-Agent; and Clarence C. Olsen, Ranger.

The faculty members are F. G. Miller, E. E. Hubert, Clarence W. Watson and Harry I. Nettleton.

The new members initiated this year are: Dr. E. E. Hubert, Galen W. Pike, '27; Charles E. Fox, '27; Henry C. Hoffman, '27; Wilfred F. Beals, '27; Wallace M. Saling, '27; Jackson W. Space, '27; and Carl A. Gustafson, '27.

A TRAGEDY OF THE HIGH RANGE

By ARTHUR W. STEVENS, '15

In the rugged country of southern Utah, Mount Dutton pokes its rocky summit above the eleven thousand foot level. Across this summit we came with a pack train, following a line of blazes that will some day become a Forest Service trail. Down near the ten thousand foot line on the other side we established a camp from which to carry on our surveying work.

The range cattle feed to the very summit of the mountain. It was then late in the season and they had sought the lower levels; but not all of them had gone. Our way was dotted with bleaching bones and carcasses, old and new, of cattle that had died from eating the deadly larkspur.

The next morning I went to look for the horses, and found them half a mile up the canyon. I found something else, too, something I had not expected. It was a young calf, all big eyes, big ears, and big, clumsy-looking legs. He stood and looked at me for one startled moment, and then,with a hump in his tail and the end dangling, he rushed away to the shelter of the nearest patch of timber. Possibly the day when he had received the earmarks and dew-lap had put the fear of all human beings into him; and then, too, he was facing the world all alone, and it did not pay to take chances. That same day we found his mother, a fresh carcass lying across a log in the timber.

We saw him frequently after that, sometimes near the horses for company, and sometimes by himself, but he always regarded us with suspicion and fled as we approached.

One morning, when I was in camp alone, I awoke to a white world. There was half a foot of snow on the ground and more in the air. The fall soon became lighter, however, and then ceased, and I went to look for the horses. Near where they had been the first morning I found the tracks of split hoofs. "Deer," I thought. The tracks turned and wound and wobbled and crossed and recrossed each other in a most amazing manner. "That deer certainly didn't know where he was going," I thought; and then I began to notice more closely. They did not look exactly like deer tracks, and they were too close together. Then, suddenly, I remembered the orphan calf.

It was entirely new to him, this white something that was cold, and that changed the appearance of the whole landscape; and he was wandering—just wandering—because there was nothing else to do. A few minutes later I found him, and this time he did not run away. He was so frightened at this new condition and he wanted the company of some living creature; but still he was suspicious, and kept a tree between us as I approached.

The first snow soon went off, and we continued our work. The marks on the calf had told us his owner, and we sent word to the ranch, but what was one little dogie, away off in the head of a canyon, when there were a thousand cattle on the lower hills to be rounded up?

The nights grew colder. Ice formed on the creek, and stayed there all day. The calf acquired a shaggy coat and a tail almost as bushy as a coyote's. And every day he grew a little thinner.

Our work completed in that vicinity, we moved five miles down the canyon. And then came the big storm. It snowed for two days; and our horses, after the manner of horses in a storm, went up, floundering through the drifts and over logs, in spite of hobbles, to the very top of Mount Dutton. And when we went to find them, there in the head of the canyon was the orphan calf. He was gaunt of body and hollow-eyed, but there was still strength

enough in his wobbly legs to carry him away from supposed danger. And there we left him, alone in a white wilderness, facing death from starvation, from the cold, and from wild animals, but still pluckily keeping alive, because the instinct for self-preservation was strong within him, and because he did not know that his was a hopeless fight.

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year of 1925-'26, with their home addresses.

Graduate Students

Nettleton, Harry I., B. S. (For.) (1921, Oregon Agricultural College,) Moscow, Idaho.
Sowder, Arthur W., B. S. (For.) 1925, (University of Idaho,) Coeur d'Alene, Idaho.
Huntington, Collis H., 11 Windsor Street, Attica, New York.
Olsen, Clarence C., Moscow, Idaho.
Pugh, Lawrence R., Springston, Idaho.
Sajor, Valentin, Cabugao, Ilosos Sur, Philippine Islands.
Walrath, Fairly, Orofino, Idaho.
White, Harold Z., Moscow, Idaho.

Class in Dendrology

Seniors

Bolles, Warren H., Little Valley, New York.
Cruz, Eugenio de la, Lingayen, Pangasian, Philippine Islands.
Doyle, Ivan S., Moscow, Idaho.
Field, Walter D.; Huston, Idaho.
Gillham, Norman F., 910 Troy Road, Edwardsville, Illinois.

Juniors

Baird, John C., 2432 N. Rockwell Street, Chicago, Illinois.
Beals, Wilfred F., Okanogan, Washington.
Burroughs, Isaac C., Poughkeepsie, New York.
Cranston, Wm. V., Mt. Vernon, Washington.
Davis, Robert, Moscow, Idaho.
Ellis, Gordon, 486 D. St., Idaho Falls, Idaho.

Fox, Charles E., 1204 Noyes St., Utica, New York.

Gregory, Charles A., 5812 N. Virginia Avenue, Chicago, Illinois.

Godden, Floyd W., River Falls, Wisconsin.

Green, Edwin G., Moscow, Idaho.

Guernsey, William G., Spokane, Washington

Gustafson, Carl A., Vancouver, Washington.

Hatch, Alden B., 1302 Locust St., Philadelphia, Pa.

Heggie, Tracy L., Montpelier, Idaho.

Hoffman, Henry C., 43 W. North St., Galesburg, Illinois.

Icarangal, Primo, Pangil, Laguna, Philippine Islands.

Sophomores

Allen, Fred R., Lester, Washington.

Balch, Prentice C., 703 Wabash Ave., Spokane. Washington.

Biker, John B., Nelson, British Columbia.

Cochran, Allen R., Sundbury, Ohio.

Connaughton, Charles, Placerville, Idaho.

Dean, Kenneth F., Dresden, New York.

Flack, Gordon I., 2017 W. Jackson Ave., Spokane, Washington.

Flock, Kester D., Moscow, Idaho.

Gamble, Boyd E., Boise, Idaho.

Frost, Levi M., 619 Sante Fe Ave., Salina, Kansas.

Garmo. George A., Bellingham, Washington.

Hedrick, Niel, Willapa, Washington.

Kidd, W. R., Moscow, Idaho.

A Corner In The Forest Products Laboratory

Johnston, Royal H., 11 Stuart St., Everett, Massachusetts.

Lansdon, William H., 1502 N. 6th St., Boise Idaho.

Lehrbas, Mark M., 744 N. Harrison, Pocatello, Idaho.

Phelps, Eugene V., Carlinville, Illinois.

Pike, Galen W., Woodstock, Connecticut.

Rowe, Percy B., Moscow, Idaho.

Saling, Wallace M., Weippe, Idaho.

Space, Jackson W., Orofino, Idaho.

Spence, Liter E., Park Ridge, Illinois.

Toole, Arlie W., Moscow, Idaho.

Ward, Ray, Republic, Washington.

Williams, Guy V., Boise, Idaho.

McKim, Floyd, 926 E. Mt. Hope Ave., Lansing, Michigan.

Mitchell, William W., 1105 Madison St., Wilmington, Deleware.

Page, Milford M., Union Springs, New York.

Seeley, Theodore A., Moscow, Idaho.

Stroud, Charles C., 303 Jeffferson St., Natchintalo, Louisana.

Sumsion, Alma B., Chester, Utah.

Williams, Griffith S:. Everoon, Washington.

Ward, Robert D., Bryan, Ohio.

Freshmen

Anderson, Ralfe, Turner Bay, Coeur d'Alene, Idaho.

Axtell, Donald H., 2604 W. Dalton Ave., Spokane, Washington.

Barclay, Kenneth M., Jerome, Idaho.

Belknap, Meldon C., Farmington, Washington.

Bollinger, Roy E., 210 Broadway, Boise, Idaho.

Boyd, Burford E., Moscow, Idaho.

Brooks, Dwight S., Hazelton, Idaho.

Buckingham, Art., Gifford, Idaho.

Coleman, William W., Cascade, Idaho.

Ficke, Herman., Payette, Idaho.

Fritchman, Holt., Payette, Idaho.

Fullerton, Claud R., Duncan, Arizona.

Fruit, Melville, Tonasket, Washington.

Kayler, Dean C., Winchester, Idaho.

Kennedy, Fred H., Dubois, Idaho.

King, Richard F., 1607 Grace Ave., Lakewood, Ohio.

Lindsay, Clive J., Hazelton, Idaho.

Luedke, John A., Chicago, Illinois.

McMahon, Daniel P., 7304 Harvard Ave., Chicago, Illinois.

Newcomb, Laurence, Coeur d'Alene, Idaho.

Oliver, George K., Orofino, Idaho.

Olsen, Walter, Buhl, Idaho.

Parnell, Kieth H., 507 Euclid Ave., Lynchburg, Virginia.

Wood Preservation Laboratory, Showing Miniature Dry Kiln

Garst, Virgil L., 504 S. 9th St., Pocatello, Idaho.

Grant, Rex P., Spokane, Washington.

Griffith, Russell D., Ritzville, Washington.

Gries, George C., 3142 Diversey Ave., Chicago, Illinois.

Gustafson, Evon H., Kellogg, Idaho.

Hanley, William A., Mountain Home, Idaho.

Hardin, Kenneth A., Buhl, Idaho.

Harman, Chris C., Richland, Washington.

Higgs, Robert L., Council, Idaho.

Hjort, George V., Kooskia, Idaho.

Hume, John F., Nelson, British Columbia.

Hockaday, James., Rupert, Idaho.

Illichevsky, George., Moscow, Idaho.

Jonson, Carl E., Kelsey, Minnesota.

Jensen, Alfred E., 1920 Hazel St., Caldwell, Idaho.

Porter, Horace M., 7532 Stewart Ave., Chicago, Illinois.

Ralph, Albert A., 1536 Kedzie Ave., Chicago, Illinois.

Reynolds, Robert B., Rupert, Idaho.

Roovaart, William C., 6637 Stewart Ave., Chicago, Illinois.

Rosell, Martin B., Elk River, Idaho.

Stanley, Wilfred B., 12 E. 27th Ave., Coeur d'Alene, Idaho.

Stowasser, Clarence E., 525 Summit Ave., Coeur d'Alene, Idaho.

Thorn, Thomas H., 70 Perry Place, Bronxville, New York.

Taylor, Milo T., Tonasket, Washington.

Teater, Arthur S., Weiser, Idaho.

Tonning, Kenneth. 1005 E. 35th St., Tacoma, Washington.
Weinmann, Attlee, Orofino, Idaho.
Welo, Vernon A., Sandpoint, Idaho.
Williams, Griffiths S., Everoon, Washington.
Wilson, Albert H., Clarks Fork, Idaho.
Young, Burris L., Moscow, Idaho.

Rangers

Brown, Philip, 1746 E. Second Ave., Long Beach, California.
Drake, Asa M. B., Victor, Idaho.
Russell, Dewitt., Moscow, Idaho.
Hunter, George S., Okanogan, Washington.
Rogers, Harold B., San Diego, California.
Clark, J. Herman., Viborg, South Dakota.
Johnson, Charles L., Mountague, Idaho.
Klemme, Maurim., Bessie, Oklahoma.
Farnham, Everett R., Star, Idaho.
Fraser, Thomas R., Colquitz, P. O. V. I. British, Columbia.
Nieland, Edwin., Priest River, Idaho.

ALUMNI AND FORMER STUDENTS

Allgood, Elmo; ex-'27; Salt Lake City, Utah.

Anderson, Mark; ex-'15; Provo, Utah; Hotel Manager.

Autrey, Lawrence; (Voc.) '22-'23; Hausan Ferry, Washington; Rancher.

Bai, Lester; ex-'27; 923 Princeton Ave., Salt Lake City, Utah.

Baldwin, Wesley; (R. C.) '24; Thorrington, Conn.

Bartlett, Stanley Foss; (R. C.) '21-'22; Locke's Mills, Maine.

Baumann, Herman; B. S. For. '24; Suzanville, Cal.; Forester; California Fruit Growers' Supply Company.

Beauregard, Clayton; R. C. '25; Fillmore, Utah.

Bedwell, Jesse L.; B. S. For. '20; Assistant Pathologist Office of White Pine Blister Rust Control, 618 Realty Building, Spokane, Wash.

Bennett, Carey; ex-'27; 579-24th St., Ogden Utah; Engineering Department, Southern Pacific Railroad Company.

Bentz, Charles E.; ex-'28; White Bird; Idaho.

Berry, Waldo Lee; (R. C.) '15-'16; Post Falls, Idaho.

Bergman, Harold E.; (R. C.) '25; Bark River, Michigan.

Bieler, Paul S.; (R. C.) '21-'22; 332 Patterson Ave., Ogden, Utah; Draftsman and Assistant Photographer, Engineering Department, Southern Pacific Railroad Company.

Brown, Frank A., B. S. For. '22, 3218 S. Hoover Street, Los Angeles, California.

Buckingham, Wm. ex-'26; Orofino, Idaho, Ranger, Charge of Grazing, Clearwater National Forest.

Callendar, Wm.; Ex-'26; Boise, Idaho.

Case, Geo. W.; (R. C.) '25; Kooskia, Idaho.

Chamberlain, Edwin Wm.;ex-'26; U. S. Military Academy, West Point, N. Y.

Chambers, Howard J.; (R. C.) '25; Baker Oregon.

Chamberlain, Fred; ex-'23; Lynn, Mass.; Sales Manager, Lumber Department Brockway-Smith Corporation.

Chamberlain, Gail B.; ex-'22; Bend Oregon; Brooks-Scanlon Lumber Company.

Clark, George W.; (Voc.) '22-'23; Route 2, Box 25, Touchet, Washington.

Clegg, Martello; ex-'27; Heber, Utah.

Cochrell, Albert N.; (R. C.) '22; Assistant Forest Supervisor, Clearwater National Forest, Orofino, Idaho.

Collins, Arthur E.; (R. C.) '25; Vancouver, B. C.

Connors, John D.; ex-'26; Prichard, Idaho.

Cossitt, Floyd M.; ex-'24; Junior Forester, Selway National Forest; Kooskia, Idaho.

Cowan, Talmadge D.; (R. C.) '15-'16; Ranger U. S. Forest Service, Targhee National Forest, St. Anthony, Idaho.

Crawford, Virgil; ex-'27; Opportunity, Washington.

Cummings, Lewis A.; B. S. For. '25; c/o Forest Service, Glenwood Springs, Colorado; Junior Forester, District 2.

Cunningham, Russel N.; B. S. For. '17; U. S. Forest Service, Missoula, Montana. Inspector Clarke-McNary Act cooperation.

Daniels, Albert S.; B. S. For. '23; Southern Pacific Building, Houston, Texas. Chemist for Southern Pacific Railroad Company.

Dart, Glen C.; (R. C.) '24; Dartford, Washington.

Daugherty, Charles Ira; ex-'22; Ranger, U. S. Forest Service, Challis National Forest, Challis, Idaho.

Davis, Roscoe E.; ex-'21; Ranger, U. S. Forest Service, Boise National Forest, Boise, Idaho.

Dawson, Robert B.; (R. C.) '25; Cranbrook, B. C.

Decker, Arlie Delos; B. S. For. '13; M. F. (Yale University) '17; Land Agent, Potlatch Lumber Company, Potlatch, Idaho.

Denning, Stewart K.; ex-'13; Sales Manager, Panhandle Lumber Company, Spirit Lake, Idaho.

Dipple, Ralph; ex-'14; Dentist, Springfield, Oregon.

Dodge, Keith A., R. C.) '15-16; Challis, Idaho.

Downer, Ernest R.; ex-'28; Sioux City, Idaho.

Drissen, J. Phillip; B. S. For. '21; Deputy Supervisor of Forests, Indian Service, Dulce, New Mexico.

Drissen, Frank J.; ex-"27; Harrison, Idaho.

Eby, Lester W.; (Voc.) '22-'23; Walla Walla, Washington.

Eddy, Lester E.; ex-'24; Warden, Clearwater Timber Protective Association, Orofino.

Evans, Phillip S.; ex-'20; Preston, Idaho.

Farrell, James W.; B. S. For. '22; Assistant Forest Supervisor, Wyoming National Forest, Kemmerer, Wyoming.

Favre, Clarence E.; B. S. For. '14; M. F. '15; Supervisor, Wyoming National Forest, U. S. Forest Service, Kemmerer, Wyoming.

Fenn, Lloyd Alfred; B. S. For. '11; LLD. (Montana University) '18; Kooskia, Idaho; Attorney-at law; Manager "Kooskia Mountaineer."

Ferguson, Ray S.; (Voc.) '22-'23; Ranger, U. S. Forest Service, Selway National Forest, Kooskia, Idaho.

Flygg, Carl J.; (R. C.) '20-'21; Blackfoot, Idaho; Surveyor, Indian Service.

Folsom, Frank B.; (Voc.) '20-'21; Ranger, U. S. Forest Service; Colville National Forest, Republic, Washington.

Fuller, Harry E.; ex-'25; Emmett, Idaho.

Garner, Lawrence H.; (R. C.) '22-'23; Midvale, Idaho; Ranger, U. S. Forest Service; Wasatch National Forest, Evanston, Wyoming.

Gatley, Howard A.; ex-'26; Boy Scout Executive; Terre Haute Council Boy Scouts of America, Terre Haute, Indiana.

Gerrard, Paul H.; B. S. For. '23; Assistant Supervisor, Clearwater National Forest, Orofino, Idaho.

Gilman, John E.; ex-'19; Obsidian, Idaho, via Stanley.

Guernsey, Wm.; ex-'27; Office White Pine Blister Rust Control; 618 Realty Building, Spokane, Washington.

Hallcraft, Vernon R.; (Voc.) '20-'21; Scaler, ? , California

Hamel, Joseph Henry; (Voc.) '22-'23; U. S. Veteran's Hospital, Walla Walla, Washington.

Hamilton, Wm. Howard; ex-'27; Santa Paulo, California.

Hammond, Geo. M.; ex-'20; Vice-President and Assistant General Manager, Bowerman Lumber Company, Glendale, California.

Hand, Ralph L.; (R. C.) '20-'21; Ranger, U. S. Forest Service Selway National Forest, Kooskia, Idaho.

Hansen, Louis W.; ex-'27; Park Ridge, Illinois.

Hanzen, Maurice H.; ex-'20; Box 904, Kellogg, Idaho.

Harlan, Paul M.; B. S. For. '25; 540 Powell St., San Francisco, Cal., Secretary-Treasurer Gas Appliance Society of San Francisco.

Hauger, Fred E.; ex-'28; Grangeville, Idaho; Rural School Teacher.

Headrick, Ralph A.; (R. C.) '16-'17, Emmett, Idaho.

Heard, Herman C.; ex-'13; County Agent, Phoenix, Arizona.

Herman, Charles H.; B. S. For. '13; (Address unknown).

Higgins, Howard H.; (Voc.) '22-'23; Ranger, U. S. Forest Service, Nez Perce National Forest, Grangeville, Idaho.

Horton, Gerald S.; ex-'27; Clyde, N. Y.

Humphrey, Clyde P.; ex-'17; State Highway Department, Coeur d'Alene, Idaho.

Hunter, Clifford H.; ex-'27; 818 Foster Avenue, Coeur d'Alene, Idaho. Field Assistant, Coeur d'Alene National Forest.

Hupe, Andrew M.; (R. C.) '25; Spokane, Washington.

Hutchins, John E.; ex-'27; Spokane, Washington.

Jackson, Tom; B. S. For. '19; Woods Superintendent, Fruit Growers' Supply Company, Suzanville, California.

Jensen, Irving R.; (R. C.) '16-'17; U. S. Forest Service, Essex, Montana.

Johanson, Robert; (R. C.) '20-'21; Ranger, U. S. Forest Service, Clearwater National Forest, Orofino, Idaho.

Johnston, Herbert Wm.; ex-'17; U. S. Biological Survey, Unalakleet Alaska, Range Investigations.

Kauffman, Alton T.; ex-'28; Orofino, Idaho.

Kelly, Robert C.; (R. C.) '20-'21; Bradford, Pennsylvania.

Kelso, Jean E.; (R. C.) '24; San Francisco, California.

Kemp, Richard L.; ex-'27; Spirit Lake, Idaho; Lumber Checker, Panhandle Lumber Company.

Kent, Howard A.; ex-'25; Bonners Ferry, Idaho.

Keyes, Geo. W.; ex-'22; Challis, Idaho.

King, Leonard A.; (R. C.) '20-'21; Orofino, Idaho.

Kiser, Wm. L.; (R. C.) '22-'23; Weiser, Idaho.

Krinf, Benjamin; ev-'24; Nework, New Jersen.

Lefler, Lowell T.; (R. C.) '24; Kamiah, Idaho.

Lewis, Leroy W.; (R. C.) '22-'23; Weippe, Idaho.

Lommason, Thomas; ex-'18; Inspector of Grazing, U. S. Forest Service, Missoula, Montana.

Luby, Lawrence L.; (Voc.) '22-'23; Idaho Falls, Idaho.

Lindstrum, F. J.; B. S. For. '11; 633 Shatto Place, Los Angeles, California.

McKinney, Clark P.; (R. C.) '22-'23; Salmon Idaho; Foreman, Shenon Land and Cattle Company.

McLaughlin, Robert; B. S. For. '25; M.S. For. (Yale University) '26; 411 East Prospect Avenue, Sedalia, Missouri.

McMillan, Carleton W.; (R. C.) '24; St. Maries, Idaho.

Madlinger, Geo. J.; ex-'24; Sewanee, Tennessee; Assistant Professor of Forestry and Engineering, University of the South Sewanee, Tennessee.

Malhotra, Des Raj; B. S. For. '25; Jammu, Kashmire State, India; Assistant Conservator of Forests, Kashmire State, India.

Malmsten, Harry E.; B. S. For. '17; 1715 Francisco Street, Berkeley, California; Assistant Professor of Forestry; University of California, Berkeley, California.

Man, Dasaundha Singh; ex-'25.

Martin, Ernest M.; (R. C.) '19-'20; Weiser, Idaho; Scaler and Commissary Clerk, Baker White Pine Lumber Company, Baker Oregon.

Martin, Paul J.; ex-19; Old National Bank Building, Spokane, Washington; Liverpool and London Globe Insurance Company, Ltd.

Maxwell, Benjamin C.; (R. C.) '22; Ranger, U. S. Forest Service, Wenatchee National Forest, Wenatchee, Washington.

Melchisedeck, L. H.; (Voc.) '22-'23; Sisters, Oregon.

Melick, Harvey Ivan; B. S. For. '23; Nampa, Idaho.

Miller, Robert A.; ev-'22; Manager, Gem State Lumber Company, Weiser, Idaho.

Miller, Wm. Byron; B. S. For. '22; M. S. For. (University of California) '25; Assistant Range examiner, U. S. Biological Survey, Reindeer Investigations, Fairbanks, Alaska.

Moody, Virgil C.; B. S. For. '17; Ranger, U. S. Forest Service, Coeur d'Alene, Idaho.

Morris, Leo Francis; ex-'16; Real Estete, 301 Savings and Loan Building, Spokane, Washington.

Munson, Oscar C.;B. S. For. '21; 740 South Olive Street, Los Angeles, California; Engineer, Southern California Telephone Co.

Myrick, Eldon H.; ex-'17; Forest Supervisor, Lewis and Clark National Forest, Choteau, Montana.

Nero, Edward T.; B. S. For. '23; Orofino, Idaho.

Newkirk, Edwin Ely; (R. C.) '16-'17; Railway Clerk, St. Louis, Missouri.

Noni, Amerigo Louis; (R. C.) '16-'17; Mackay, Idaho.

Parsons, Ralph H.; ex-'14; Assistant Land Agent, Clearwater Timber Company, Lewiston, Idaho.

Parsons, Russel M.; B. S. For. '24,; Clearwater Timber Company, Lewiston, Idaho.

Patrie, Carthon R.; B. S. For, '22.

Potter, Arthur; (R. C.) '24; Assistant Supervisor, Boise National Forest, Boise, Idaho.

Poynor, Neal E.; (R. C.) '21-'22; Ranger, U. S. Forest Service, Salmon National Forest, Salmon, Idaho.

Rector, Charles M.; ex-'28; Bryan, Ohio.

Renshaw, Elmer W.; B. S. For. '25; Deputy State Forester, Idaho; Moscow, Idaho.

Rettig, Edwin C.; B. S. For. '19;Land Agent Clearwater Timber Company, Lewiston, Idaho.

Reuterskiold, France: (Voc.) '22-'23; Atkinson, Wisconsin.

Rigney, Darrel P.; ex-'28; Jerome, Idaho.

Rigney, Jesse W.; ex-'28; Jerome, Idaho.

Robinson, Ernest G.; (R. C.) '24; Forest Service, Clearwater National Forest, Orofino, Idaho.

Roat, Celeste A.; '25; Red Lodge, Montana.

Roeder, Charles; (R. C.) '20-'21; Streator, Illinois; Bookkeeper.

Rodner, Jack W.; ex-'25; Office of Whie Pine Blister Rust Control, 618 Realty Building. Spokane, Washington.

Ross, Ralph B.; ex-'26; 720 W. Sixty Ave., Gary, Indiana; Engineering Department, Chicago and South Bend Railroad Company.

Ross, Oral O.; ex-'27; Long Beach, California.

Ruckweek, Fred J.; B. S. For. '17; Gettysburg Public Schools, Gettysburg, S. D.

Rudesill, Ralph M.; (R. C.) '20-'21, Bradford, Pa.

Runberg, Victor; (Voc.) '22-'23; Hedlund Box and Lumber Company, Spokane, Washington.

Ryan, Cecil C.; B. S. For. '24; Moscow, Idaho.

Salvin, Otia Wm.; ex-'19; Carmen, Idaho.

Schofield, Wm. B.; B. S. For. '16; Topographic Engineer, Hammond Lumber Company, Samoa, California.

Seeley, Theodore A.; '28; Moscow, Idaho.

Shaner, Fred; (Voc.) '23; Ranger, U. S. Forest Selway National Forest, Kooskia, Idaho.

Sharma, Parmeshwri Das; M. S. For. '22; Forest Expert, Department of Forestry, Gwalior State, Central India.

Smith, Henry L.; ex-'14; Administrative Assistant and Clerk, Challis National Fores. Challis, Idaho.

Smith, William H.; (R. C.) '25; Tygh Valley, Oregon.

Snow, E. A.; B. S. For. '25; Junior Forester, U. S. Forest Service, Foxpark, Wyoming.

Sowder, Arthur M.; B. S. For. '25; Logging Department, Rutledge Timber Company, Clarkia, Idaho.

Space, Ralph S.; B. S. For. '25; Ranger, U. S. Forest Service, Blackfoot National Forest, Kalispell, Montana.

Staples, Howard W.;B. S. For. '20; Resident Manager, Yukon Gold Company, Murray, Idaho.

Stevens, Arthur W.; B. S. For. '15; Editor and Manager "The Kearney Democrat", Kearney, Nebraska.

Stillinger, Charles Roy; Special '19; 618 Realty Building, Spokane, Washington; Associate Pathologist, Bureau of Plant Industry; Office of White Pine Blister Rust Control, Spokane, Washington.

St. Mar, Albert W.; (R. C.) '25; Spokane, Washington.

Stone, Capt. Lawrence F.; ex-'15; Commanding Officer, Arcadia Balloon School, Arcadia, California.

Stoneman, Warren J.; ex-'24; Route 9, Hillyard, Washington.

Storms, Willard S.; ex-'23; Farmer, Rupert, Idaho.

Stroud, Charles C.; ex-'28; Natchitockes, La.

Sumsion, Byrd,; ex-'28; Chester, Utah.

Teed, Ryle; ex-'23; Forest Examiner, U. S. Forest Service, Portland, Oregon.

Tucker, Gerald J.; (R. C.) '25; Elgin, Oregon.

Vick, Ernest R.; (R. C.) '19-'20; U. S. Forest Service, Luther, Montana.

Vickery, Dwight R.; ex-'28; Firth, Idaho.

Wadsworth, Herbert A.; B. S. For. '11; Major, U. S. Infantry, Fort Howard, Maryland.

Ward, Raymond; ex-'28; Bryan, Ohio.

Wheaton, Rogers G.; B. S. For. '24; M. (F. Yale University) '25; U. S. Forest Service, Gardner, Montana.

Wells, Harold E.; (R. C.) '25; Manitoba, Canada.

Whitaker, Clarence; (R. C.) '25; Elba, Idaho.

Whitaker, Frank S.; (R. C.) '25; Elba, Idaho.

Whiting, Geo. M.; R. C. '25; Spokane, Wash.

Williamson, Charles L.; ex-'14; 218 Alaska Building, Seattle, Washington; Northwest Manager, Power Regulation Company, Chicago, Illinois.

Yates, Donald; B. S. For. '17; Assistant Manager, Exter Investment Company, 714 Holland Building, Seattle, Washington.

Youngblood, Frank; (R. C.) '22-'23; Ranger U. S. Forest Service, Minidoka National Forest, Burley, Idaho.

Zuver, John H. Jr.; ex-'25; 710 Rex Street, South Bend, Indiana; Vice-President, Mirror Press Company.

Cooperative Research With Western Pine Manufacturers' Association

Research work conducted at the School of Forestry on the properties, defects and uses of wood has received a decided impetus through the cooperative agreement recently entered into between the School of Forestry and the Western Pine Manufacturers' Association. This agreement calls for the carrying out of a definite program of research which includes specified projects covering problems of immediate and vital interest to the western pine industry. The problems, so far outlined, deal mainly with improvements in the use of the wood products and include for study such factors as natural durability, moisture content in relation to decay and stain, and new commercial uses for certain species.

Arrangements have been completed for obtaining the additional equipment and personnel necessary to carry out these cooperative projects. Beginning with the opening of the fall semester attention will be concentrated on the development of a research organization actively engaged in attempting to solve some of the numerous problems confronting the lumber industry in Idaho.

LETTER FROM MR. D. R. MALHOTRA, '25

Friends of D. R. Malhotra, a young man from India, who graduated from the School of Forestry in 1925, will be interested in extracts from a letter recently received from him by Dean Miller. Mr. Malhotra now holds the important post of Assistant Conservator of Forests to the State of Kashmire, India. His letter in part is as follows:

"I left Seattle, U. S. A., with feelings of mingled pleasure and sorrow—pleasure because I was returning home after five years sojourn in America, and sorrow on account of missing the happy company of my associates. Having landed in Japan, I had the privilege to enjoy the friendship of many Japanese, who left no stone unturned to unravel the mysteries of Japan before me. I visited Imperial University of Tokyo, museum and other edifices and sights of interest. Next I visited the cities of Yokohama, Kobe, and several others in the Japanese Empire.

"Leaving Japan I landed at Shanghai, an international port, where I found a heterogeneous mass of all races. Next I came to Hongkong, a British Crown Colony, where I enjoyed a great deal for full one week. Leaving Hongkong I visited Singapore and Penang, two big cities in Malay State. where I learned a great deal of their primitive civilizaton. Next visited Rangoon, Burma, on my way to Calcutta the largest city in India. Boarding the express train at Calcutta, I reached my destination safe and sound.

"There was a large throng of friends and relatives on the railway platform to pay me a hearty ovation. As soon as I stepped down from the train, I was profusely garlanded by relatives, and taken home in automobile (which is a prerogative of the rich people alone) amid cheers and applause. You are fully aware of the fact that I have a daughter born while I was in America, but did not have the least difficulty in recognizing her. All members of my family, and especially my wife and mother were transported with joy on my safe return home after a long separation and I noted tears of joy in the eyes of my wife, mother and father. I thank Almighty for that day, when I had the luck to see my family members and old class mates wishing me success in my future life.

"You will be glad to learn that I have been appointed as Assistant Conservator of Forests, (a rank equivalent to District Forester in the U. S.), and will be posted in Kashmire Circle. Now my future prospects are insured for all time to come."

Yours sincerely,
D. R. MALHOTRA,
Kashmire Forest Service,
Jammu, India.

A Creditable Record

An enviable record was hung up recently by three seniors of the University of Idaho school of forestry when all three passed federal junior forester examinations in competition with 167 applicants over the country. Of the 167 to take the examination only 36 passed with grades above 70, three of those being this year's graduates of the Idaho school.

The three and the only candidates from Idaho to take the junior forester examination, all passing, were Harold Z. White of Moscow, Clarence C. Olsen of Seattle and Warren H. Bolles of Little Valley, N. Y.

THE ANNUAL BANQUET

The tenth annual banquet held at the Blue Bucket Inn the night of February 16 was one of the most successful events the Associated Foresters have ever staged.

The program was replete with music, good will and excellent speaking. Clarence C. Olsen presided as toastmaster. Those appearing on the program were: President A. H. Upham, who spoke most entertainingly of his impressions of European forestry; J. H. Heckathorn, representing the Moscow business men; W. R. Renshaw, deputy state forester; Dean H. C. Dale of the School of Business Administration; Rev. E. S. Muckley of Moscow; Warren H. Bolles, representing the Associated Foresters; C. R. Stillinger, speaking for the alumni and former students; Fred Morrell, prominnent in U. S. forestry circles. representing the Forest Service; and the guest of honor, Dr. C. A. Schenck of Darmstadt, Germany, widely known in both Europe and America for his achievements in forestry. Dr. Schenck, speaking in a delightfully humorous vein gave his impressions of America and her institutions, based upon personal observations covering thirty-two years. "America," he said, "stands for good will toward all mankind."

THE THIRD ANNUAL BARBECUE

The third annual barbecue of the Associated Foresters was held on Saturday, May 14. at Felton's Mill. twelve miles northeast of Moscow.

Log Sawing Contest, Barbecue, 1926

Leaving Moscow shortly after noon, the entire school, including faculty, students and guests, proceeded to the scene of activities by auto caravan. The afternoon events consisted of boxing and wrestling matches, foot races, log rolling, sawing and chopping contests, swimming races, and a tug of war between the upper and lower classmen. The

interclass competition was exceptionally keen. The Juniors won the field meet with a large margin of points to spare.

A business meeting, including the annual election of club officers, followed the field meet. The club leaders for the coming year are as follows: Floyd Godden, President; Arlie Toole, Vice-President, and W. M. Saling, Secretary-Treasurer.

The speeches of the newly elected officers were interrupted at six o'clock by "Chef" Allen's welcome request to "Come and get it or we'll throw it to the fishes." An hour later eighty-five foresters and their guests were safely on the outside of a choice collection of roast meat, baked beans, buns, doughnuts, ice cream, cookies, coffee and cigars—the grand finale of a perfect day and a highly enjoyable event.

The Kitchen Squad, Barbecue, 1926

Priest River Forest Experiment Station an Asset to the School of Forestry

The generous offer of the Director of the Rocky Mountain Forest Experiment Station to the School of Forestry to use the Priest River Branch Station as one of its primary field laboratories was taken liberal advantage of this year. The sophomore class in seeding and planting under the direction of Prof. C. W. Watson spent a week at the Station in April, engaged in actual planting operations, and as noted in another column the senior class enjoyed a most profitable fortnight there in May.

The Station is within eight hours' run by motor truck from Moscow, and is ideally situated and equipped for instruction. Its four thousand acres of experimental forest together with the Kaniksu National Forest of wihch the station forms a part, and the adjacent state forest, also under management, makes it one of the richest fields in the west for forest research and study. It is certain that classes in forestry will continue to make frequent pilgrimages to the Priest River Branch Station.

Opportunity for Employment

That every member of the senior class had a good job before he graduated and that every available undergraduate was placed for the summer well before the close of the year attests the facilities of the Idaho School to find remunerative employment for its students.

A statement of appointments received by the class of 1926 appears in another column. A canvass of assignments received by the undergraduates shows them to be scattered throughout the several states of the northwest though the most of them are in Idaho. The bulk of the boys will be with the U. S. Forest Service in various capacities. The next greatest number will be employed by the office of Blister Rust Control. A number will work for private concerns. Three will be in the employ of the university and two will be on state work. As usual the demand for men exceeded the supply.

Valuė of Wood River Trees

(An Editorial)

"H. I. Nettleton, instructor in the School of Forestry, University of Idaho, and two student assistants last July made the first scientific survey of the timber resources on Wood river between Ketchum and Bellevue. The Times-News-Miner has been favored with a copy of the report of this survey just completed. It is worthy of careful study and the recommendations accompanying it are of special value. It has been customary to hold the cottonwood timber in contempt, but with the vaulting prices of all kinds of lumber and the corresponding necessity of utilizing every stick of lumber within reach, this information relative to the cottonwood and the aspen of this immediate vicinity is worth much especially to those who own the land upon which these trees can be so readily grown. The uses to which these trees may be put and the future possibilities of this limited timber belt are matters worthy of the careful consideration of every citizen of this community. This report of Mr. Nettleton's furnishes another proof that there is often wealth lying right at our doors; wealth that we overlook and ignore in our hungry search for other forms of wealth."

—Times-News-Miner, Hailey, Idaho.

Federal Aid in Tree Distribution

By an agreement entered into the past year with the U. S. Forest Service under the provisions of the Clarke-McNary Act the School of Forestry now receives federal aid in its tree distribution project and is now expanding its forest nursery to meet the growing demand for forest planting material.

For a number of years the School has been distributing forest trees at cost in order to encourage tree planting within the state. This policy will be continued as regards to ornamental stock, but under this cooperative agreement, the School will now supply forest planting stock to establish windbreaks, shelterbelts and woodlots at about one-half the cost of growing and packing it.

The plan of growing and distributing trees at cost was conceived by Dr. C. H. Shattuck, first dean of the School, and was put into operation in the spring of 1910. Time has proved the wisdom of the undertaking. The site chosen for the nursery is a northerly slope just back of the campus and athletic field. The soil and moisture conditions are admirably adapted to forest nursery purposes. From the beginning Mr. C. L. Price has been in charge as forest nurseryman and has contributed his years, industry, and skill to the success of the enterprise.

Plans underway to give the state more adequate service include the expansion of the nursery to several times its present capacity. It is especially desired to encourage windbreak, shelterbelt and woodlot planting in order that forestry may take its rightful place in the program of diversified agriculture. The growing of shade trees will also be put on a much larger scale in order to give the public better service in ornamental planting.

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(Photo courtesy H. Hubert Jr.)

THE RIVER'S VINDICATION

It's true I've gone on the war path,
I've smitten your cities and homes,
I've cracked the walls of your stately halls,
I've threatened your spires and domes.

I've spoiled your gardens and orchards,
I've carried your bridges away,
The loss is told in millions of gold;
The indemnity you must pay.

But had I not cause for anger?
Was it not time to rebel?
Go, ask of the springs that feed me;
Their rock ribbed heights can tell.

Go to my mountain cradle,
Go to my home and see,
Look on my ruined forests
And note what ye did to me.

These were my silven bowers,
My beds of bracken and fern,
The spots where I lie and rest me
E'er to your valley I turn.

These you have plundered and wasted,
You've chopped and burned and scarred,
Till my home is left of verdure berett,
Bare and lifeless and charred.

So I have gone on the war path;
I've harried your lands with glee.
Restore with care my woodlands fair
And I'll peacefully flow to the sea.

—*F. W. Nash.*

Forestry in the Public Schools

Through the good offices of C. J. Brosnan, associate professor of American history, University of Idaho, an excellent statement of forestry in Idaho is now available to the school children of the State through his textbook on the History of Idaho, adopted as the official text for use in the public schools.

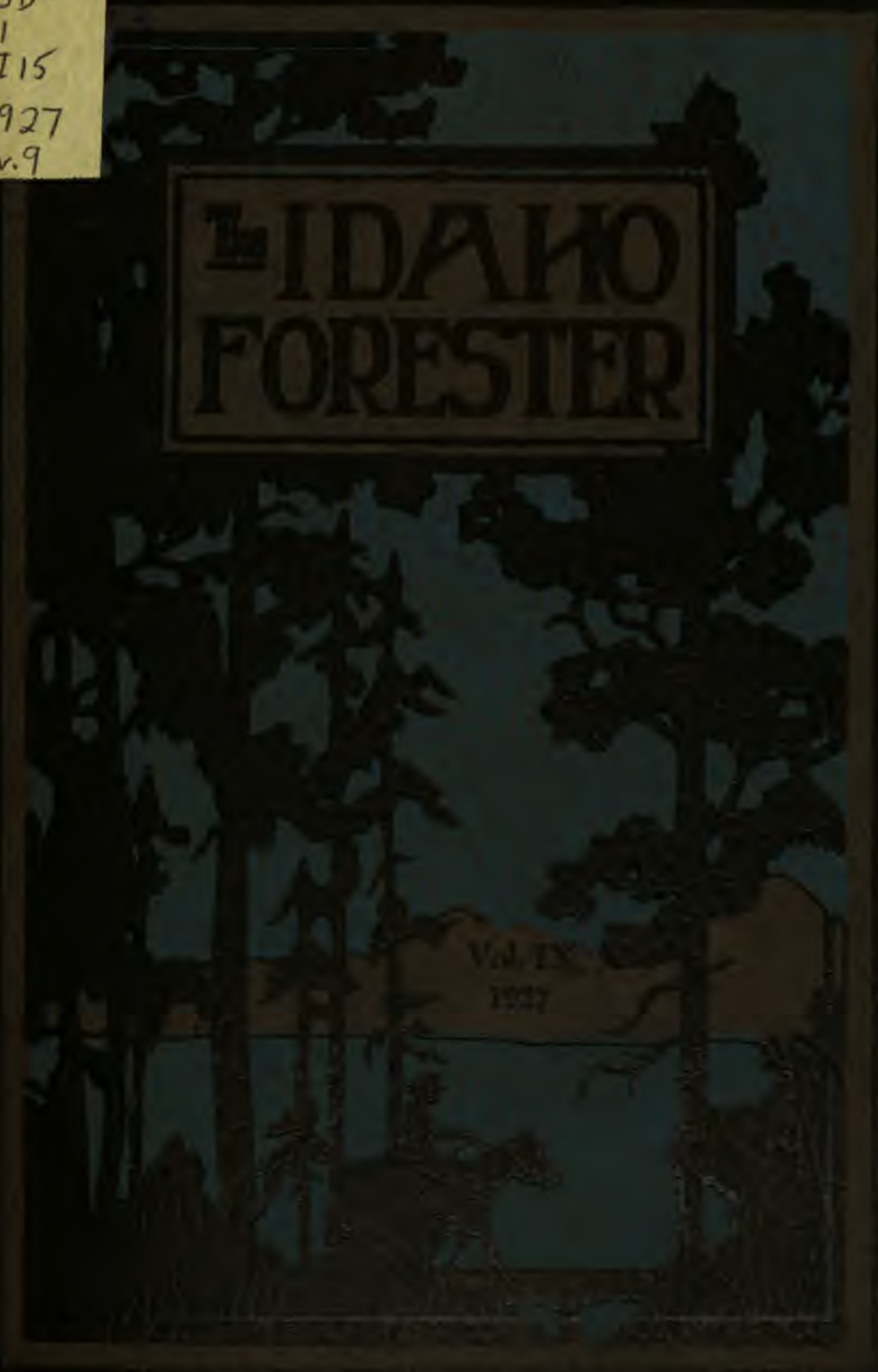
E. H. Holmes, professor of geography at the Lewiston Normal School has also written a splendid chapter on the forests of Idaho for the geographies in use in the State. Thus it is that through these two authoritative sources the school children of Idaho have access to reliable information regarding one of the state's most important resources.

Where Our Graduates Are Employed

Since it is through the work of its alumni that the School of Forestry renders its greatest service, it is of interest to know in what lines of work these men are engaged. A canvass of the list, including the class of 1926, shows that practically all of them were engaged in some phase of forestry work for a time, and that 72 per cent are actually so employed at the present time. Of the eight men graduating in 1925 all but one are in the profession of forestry, and as noted elsewhere in this volume 100 per cent of the class of 1926 will either engage in the forestry work, or will pursue graduate work in forestry.

Of the 72 per cent of the alumni now in forestry practice, 47 per cent is in some form of public service, and 27 per cent is employed in private forestry. In point of the number employed, the federal government lays first claim to the graduates. The lumber business is a close second, the demand coming largely from the timber companies.

In this connection it should be stated that a large number of former students whose courses were unavoidably interrupted are likewise well established in some phase of forestry work, and are rendering commendable service.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IS RESPECTFULLY DEDICATED
TO THE

Graduates

OF

The School of Forestry

University of Idaho

EARLY DAYS IN FORESTRY AT THE UNIVERSITY OF IDAHO

By Dr. C. H. SHATTUCK *

It is a far cry across the years from 1909 to 1927, almost eighteen of them having slipped by since the first courses in forestry were offered at the University of Idaho. Many students and faculty members have come and gone since that opening day in September, 1909, when eleven students enrolled for the long course in forestry and the public wondered what it was all about. It was the writer's privilege to have had charge of these first courses, some of which are still maintained while others have given place to the more up-to-date requirements of present day forestry—far more practical than that of 1909.

Western Forestry in the Making

In those days forestry in America, especially in the West, could hardly be called a science, the work being so incoherent and incompletely organized that the outlining of courses of study in many of the subjects to be taught was a matter of great difficulty, and more or less of an experiment.

We had the theories of the European foresters and their text books, also some from the eastern part of our own country, but many of these were at the widest variance from the practices and conditions as we found them on the Pacific Coast, and we had to adapt and modify theories to suit conditions. Everything was different, especially size and species of trees, their diseases, insect enemies, methods of cruising, scaling, logging, manufacture, grades of lumber, etc. We therefore had to start from the facts as we found them in nature and the variable practices then obtaining in western forestry, and build up our courses as best we could, often changing them as we learned more of what was needed, in order to train our students to be good practical field and mill men. Our laboratories and class rooms were small and inadequate but our field, those "endless woods where rolls the Oregon" and its tributaries, was well nigh limitless.

Field Work

"Nature the old Nurse took the child upon her knee saying, 'Here is a book I've written for thee.'" With this quotation as a slogan we went to the forests, the logging camps, and the mills to get the facts. There we learned to know the trees in their environment and the practices and methods of the western logger, cruiser, scaler, sawyer, grader, etc., and from this field work gradually our courses in forest protection, management, finance, and lumbering grew to be intensely practical, and the men taking these courses, and later going out to responsible positions have as a general thing ranked well and given good accounts of themselves, many of them still active in positions of responsibility with good prospects of further advancement.

Forestry at Idaho had to "Win Its Spurs"

Like every new course that has from time to time appeared in the curricula of American colleges and universities, Forestry was not looked upon with favor by some of the faculty and students of the old and well established courses. The forestry course was considered as more or less of a fad—an untried experiment—and its faculty and students were regarded as rather outside of the family of colleges. Both faculty and students had to stand the tests by which the other departments had earned the reputation, and standing which each enjoyed. In other words we had to "win our spurs" in scholarship and in general college activities—especially in athletics. We acepted the challenge and entered lustily into all kinds of college tests and activities. In a comparatively short time we were accorded the due respect and consideration of the older colleges, for both faculty and students "buckled in" with a "right good will" and where ever the department was represented it acquitted itself in such a manner as to impress everyone with its seriousness of purpose and its determination to do its very best at all times to make and hold not only a name for itself but to advance the interests and high standing of the University in every field where service could be rendered.

Opportunities on Every Hand

Opportunities were not lacking for such service, either on the part of the faculty or students. The professors (at first only one) were in demand as public lecturers at agricultural, lumbering, forestry, and general scientific and educational meetings and never

* To Dr. Shattuck, as its organizer and first directing head, credit is due for placing the Idaho School of Forestry on the sound basis which has made possible consistent growth and ever increasing influence in the promotion of forestry in Idaho. In his eight years of pioneering for forestry he rendered the state notable service.—*Ed.*

failed to respond, their efforts being very generally and generously well received. There was much hard work to be done on the faculty committees and here again they were found contributing all they could. In athletic and general student activities the forestry students were soon the recipients of many positions of responsibility, the records of the past revealing among the student leaders many names of Idaho Foresters.

The large lumber companies and the Forest Service at once began to try out both faculty and students to assist them in the vast amount of practical and theoretical work needing attention. So great was this demand, and so urgent was the call to get at this work with the least possible delay that special permission was obtained each year to allow early "exams" in order that faculty and students could be in the field in early June. In fact it was not until the forestry department, as it was then called, began to have graduates that commencement week ever found a single representative remaining on the campus. We were all at work in the field and there we remained to the very last day before time to register for the next year's work, some even remaining one or two weeks after that date, making up the "back work" later.

Eastern White Pine, Age 16 Years, Pruned to Height of 7 Feet

Character of the Early Students

It is unnecessary to enumerate the many excellent and hardy young men who presented themselves for registration in the forestry department in the early years of its existence. The records they have made amply testify to their sterling worth and high character. It is well known that in our universities many newly established departments fall heir to the ne'er-do-wells from other courses, but there was very little "switching" from the other courses to the forestry department when it was established, practically none coming from other departments for the reason above indicated. The writer could say much of a highly commendable nature of such fine boys, now almost middle aged men, as Fenn '11, Father of the present Idaho Forestry Law, Major Wadsworth '11, U. S. A. Infantry and first assistant instructor in forestry at the University of Idaho, Denning '11, Kendall '11, Herman '13, Decker '13, Hillman '12, Thornton '13, Favre '14, Parsons '14 Anderson '13, Youngs '15*, Moody '17, Schofield '16, Carlson '16*, Cunningham '17, Malmsten '17, "Red" Johnston '17, Humphrey '17, Yates '17, Jackson '19, Munson '21, and many others whose long records of splendid service are well known and testify that they were in earnest when they chose to enter the Forestry courses at the University of Idaho. The training they acquired though far from perfect was such as to fit them well for the battle of life. Suffice to say that they saw in forest-

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* Killed in France.

PRIVATE FORESTRY IN IDAHO

By A. D. DECKER, '13

Idaho may be classed with the typical forest states of the West. The beneficial influence which its forests exert in the economic, social and political structure of this commonwealth is apparent and of vital importance.

Lumbering industries of magnitude and communities dependent upon them have grown up in the timbered regions of the state. In the arid regions thousands of acres of desert land have been put under irrigation systems, the source of water for them emanating from forested watersheds. Following these irrigation developments numerous agricultural towns have sprung up.

The prosperity of this state—still in the pioneering stage of development—largely depends upon outside markets for the products of its mines, forests and fields. No industry brings in as much outside capital expended locally in wages and supplies as does lumbering. At the same time large revenues accrue annually to the treasuries of the state and its political subdivisions from its forest lands and timber industries. It is evident, therefore, that the future growth and welfare of Idaho will be greatly influenced by the perpetuation of its lumbering industries and the permanent productivity of its forest lands.

The Forest

A glance at a forest relief map of Idaho shows that approximately two-fifths of the total area were originally forest lands. This expanse of forest acreage spreads across the Panhandle in the north and extends from Canada to the sage brush areas at the lower and more arid elevations in the south.

At the present time statistics show forty-two per cent of the original area has been logged or burned. On the balance of the forested area it is estimated there are over eighty billion board feet of standing timber, much of which is remote and inaccessible. The great bulk of the remaining area is characterized by rugged divides and precipitous slopes, and consequently will carry high logging costs.

In lumber production Idaho ranks twelfth among the states, with an annual production slightly over one billion board feet. Over seventy-five per cent of the lumber manufactured is marketed out of the State, principally in the competitive markets of the East and Middle West.

Two commercially important forest types, being exploited at the present time, give distinctive character to the lumber industry of Idaho, the western yellow or pondosa pine, occurring throughout the state as a foothill type, and the true white pine found only in northern Idaho In addition to the Pondosa and white pine we find the less valuable "mixed species", viz., Douglas fir, white fir, larch, spruce, lodge pole pine, hemlock and cedar, occurring in various types and intermixed stands. These mixed species add greatly to the complexity of the problem from the standpoint of utilization as well as silvicultural practise.

Under present conditions these mixed species have but small stumpage value. However, they are being utilized by some operators to supply a certain market demand and also to assist in marketing the pine. At the same time the demand for these woods is being stimulated by forcing them on the market and new outlets are being developed. Generally speaking, they are marketed at a loss.

The wide diversity in types and stands further reflects the great variance throughout the state in topography, soil and climatic conditions. The differences in types and value in species emphasize the difficulty in prescribing, either by statutory regulation or otherwise, any one formula for forest management for the state in its entirety. Each stand of timber and every operation presents problems, both physical and economic, peculiar to itself which must be considered in arriving at a workable forest policy .

Forest Ownership

In casting about for a conclusion as to the source of Idaho's timber in future years, a consideration of the present ownership is of interest. Statistics show, on an acreage basis, ninety per cent of the forest land of the state belongs to the national government; three per cent is owned by the State; and seven per cent is in the hands of individuals and corporations. From the standpoint of merchantable timber, reports show the federal government holds but sixty-one per cent, the State nine per cent, and the individual and corporate ownership approximately thirty per cent. In contrast to the foregoing figures, eighty-five per cent of the present lumber production of the state originates from the lands owned by individuals and corporations.

It is with this private ownership that the public is most concerned.

The federal ownership is largely embraced in the nineteen national forests wholly or partly within the state. The administrative policy of the Forest Service is to manage its lands and conduct its timber sales on a sustained yield basis.

Trend of Forest Thought

Idaho, through its Forestry Law, which became operative in 1925, provided for the establishment of a state forester and a cooperative board of forestry. This was a progressive move and gives assurance of permanency in timber production on the forest lands belonging to the state. These lands, acquired by congressional land grants, include much valuable timber and sales therefrom follow well defined forestry regulations.

Within recent years there has been a marked shift in thought along forestry lines from the idea that reforestation was purely a responsibility of public ownership to the proposition that it should be undertaken as a private enterprise, or, more logically, as a voluntary cooperation between public and private interests.

Public attention is, therefore, being centered—not alone in Idaho, but in all timber producing states—on the private owner, his present methods of management and future policy, with particular concern being given to the increasing cut-over acreage. On the other hand—and of equal significance and concern to the private owner considering the adoption of a reforestation policy—is the general public attitude toward his property rights, cooperative forest protection and matters of taxation.

This awakened interest in forestry as a private enterprise is evidenced by the publicity given the subject in our newspapers, trade journals and forestry publications. Much time is devoted to the discussion of the problem in logging congresses, lumber manufacturers' conventions and forestry meetings. Forestry legislation is being proposed and voted upon. Women's clubs are studying the situation and grade school pupils are writing essays on the subject. The public is "sold" on the forestry idea generally, but the individual or corporation, in the embarrassing position of owning the acreage, has not been wholly convinced that the growing of timber as a business venture is a profitable investment for him or his principal's capital.

Forestry a Business Enterprise

All are agreed that forestry, whether practised by public or private enterprise, is a business proposition and must pay directly or indirectly. However, there are essential and varying conditions peculiar to each. It must pay the individual or corporation in terms of a satisfactory return on invested capital, or as a means of protecting and prolonging the life of investments in railroads, mills and equipment. It is not essential, however, that forestry practise as a public enterprise pay directly in terms of money value. If based on sound economics, it may pay indirectly in necessary provision for timber needs, in stream flow stabilization, preservation of scenic beauty and in stimulating recreational use of the forest.

In considering the private ownership within the State of Idaho and the future possibilities of permanent forest management, the fact must not be overlooked that Idaho, although large in area, has a small and scattering population. The 1920 census reports show an average of 5.5 persons to the square mile as compared to an average of 35.5 persons to the square mile for the United States.

Unlike many of our older and more densely populated states with good local markets for all kinds of timber products, Idaho has no timber tracts owned by individuals who—for commercial reasons, or being prompted by personal motives and pride in ownership—are practising well defined forestry methods. Neither are there large estates nor holdings by pulp companies and minor wood using industries such as typify exemplary forestry in the East where economic conditions are highly favorable.

In Idaho the most accessible privately owned forest lands are those held by lumber companies. These holdings are generally well blocked in large tracts, with occasional small intermixed acreages owned by individuals who are holding for speculation or awaiting developments in order that they may dispose of their timber to operators.

There is also an increasing acreage of "uncertain ownership" represented by individuals who—by reason of poor timber selections in unmerchantable and remote stands and the impact of increasing carrying charges—are becoming discouraged and letting these lands revert to the counties in default of taxes. These "tax bankrupt" lands are offered and reoffered at tax sales and in many cases sold and resold to speculators.

In this state, therefore, it is only reasonable to assume that, for some time to come, only such privately owned lands as are held by large lumber companies will be managed with any degree of thought given to future timber production. The interest taken by concerns in adopting reforestation programs will vary greatly depending upon the invested capital and the amount of stumpage ahead of the operation. For many, the turn in the tide will come too late.

To date, no company in Idaho has announced itself as having adopted a well defined reforestation policy working toward a continued operation. For some operators, the end is in sight. For others, such a program is possible on a limited production basis. Such announcements have been made in recent years by large individual concerns operating in the southern pine region of the South, the redwood and sugar pine regions of California, and the Dougas fir region of the Northwest. These regions, in contrast with the intermountain pine regions of Idaho, are particularly favored with ideal growth conditions—humid climate, mild and moist winters—and native species capable of rapidly responding to these favorable climatic factors. In these regions merchantable timber can be grown in one half the time required in Idaho. They also have the decided advantage of being close to growing industrial centers and tributary to tide water giving them the opportunities of water transportation and local as well as world markets.

Decided Tendency Toward Conservation

The fact that Idaho has not embarked upon an announced policy of forest perpetuation by private initiative does not necessarily imply that progress has not been made. Neither does it imply that the lumbermen of the State do not realize and appreciate the importance of the issue from the standpoint of future public welfare. They, perhaps, better than any other class of citizenry, realize the total dependence of many communities upon the continuance of a timber supply. Their livelihood depends upon it.

The majority of Idaho lumbermen have followed the industry westward. They have witnessed the cuting out of lumbering operations, the junking of mills and the abandonment of homes and communities. They have also observed the transformation of green timbered watersheds into blackened logged-off areas with the resulting decrease in stream flow. As a part of the lumbering communities, in which they make their homes, they are vitally interested and are giving considerable thought to the problem.

Aside from the purely sentimental side of the picture, lumbering as stated is a business and, as such, it must be conducted along economic lines in accordance with sound business principles. Lumbermen who are entrusted with the management of the industry are directly responsible to their stockholders. Unless a fair margin of profit is made, capital will soon be dissipated and financing will stop.

Forestry, therefore, when considered as a private enterprise, involves not only the physical factors pertaining to forest crop production but also the equally important economic factors of profitable marketing, efficient utilization, adequate protection, operating costs and financial outlay in the form of initial and cumulative charges. As a business venture, these factors must be considered from the point of view of the present as well as the future. In application, forestry methods may be intensive or extensive, depending largely upon the varying economic conditions confronting the forester or operator.

The lumber industry in Idaho has made marked progress along lines of forest conservation. Today, in the better pine mills of the state with their modern milling machinery, dry kilns, remanufacturing plants, box factories and moulding departments, utilization and manufacture is refined to a point unsurpassed in any region. This refinement is also reflected in closer utilization in the woods.

New markets are being developed for the lower grades of lumber and the less valuable mixed woods. Attention is being given to standardization of grades and utilization of short lengths and advertising campaigns are being financed setting forth the merits of our various woods for the uses to which they are best adapted.

This progress along lines of manufacturing and marketing is gradually enhancing the value of stumpage and thereby hastening the day of more refined silvicultural practise.

Fire prevention is generally recognized as being the most urgent responsibility confronting the timber owner. Without adequate protection there is neither assurance that present stands can be saved and utilized nor is there any chance of fostering young growth. Experience has proved conclusively that the logged-off areas of Idaho will restock naturally,

as they did originally, if repeated fires are prevented.

In the timbered area of Idaho we have most difficult fire seasons and the worst fire risk and hazard of any timbered section of the United States. This is a region of dry summers, low relative humidity, disastrous lightning storms, rough topography and heavy slash and undergrowth. In meeting this situation, efficient cooperative timber protective associations have been organized. Idaho enjoys the distinction of being among the foremost of all States in this line of endeavor. The idea had its inception in northern Idaho over twenty years ago through the efforts of lumbermen and timber owners. The principles involved have been recognized and adopted throughout the nation. The bulk of the privately owned timber in the State is now embraced within well organized and well financed associations which are cooperating with federal and state agencies in all matters of forest protection.

While the fire problem still confronts us, the continued development of lookouts, roads, trails, telephone lines and use of air patrol are putting standing timber in the position where it may be considered as an insurable risk. Not only is merchantable timber being protected by these associations but cut-over lands and unmerchantable stands are receiving their proportionate share. It is pertinent to any forestry program that the logged-off areas be protected from recurrent broadcast fires.

Forest Investigations

Private forestry agitation in the past has been characterized by generalities, prophesying and a lack of definite information. This lack of fundamental knowledge is the result of our willingness to rely almost entirely upon the results of past failures and to continue along traditional lines of long established practise without making an effort to get at the fundamentals by systematic research.

A stage in the industry has now been reached when the situation calls for this line of endeavor. Lumbermen would like to believe in the ideals of forestry and are seeking more definite knowledge of costs and final realization. The Forest Service and forest schools are cooperating with operators along research lines. The Western Forestry and Conservation Association has included a research department to handle forestry problems for its contributing members. Private foresters are also entering the field in Idaho to render this service.

Within the past year, two of the largest operators in the state have conducted studies under the supervision of trained foresters. An inventory of the lands was taken looking toward the possibility of adopting some sort of a forest policy with consideration being given to the restocking on cut-over areas, potential value and growth of residual stands, cutting systems and results obtained by various methods of slash disposal. These investigations show conclusively that the problems of slash disposal and prevention of recurrent fires are of prime importance, and, at the same time, the most perplexing in any forestry program adopted in Idaho. Nature is restocking these logged-off areas where given a chance.

The day of more refined forestry practise by lumbermen in Idaho has been greatly delayed by adverse conditions and economic factors tending to discourage any radical changes in management.

The lumber industry is highly competitive. Transportation developments have, in fact, pooled the immense timber resources of the nation with the result that woods from all regions are competing in the large markets of the East and Middle West. The bulk of the lumber produced in Idaho is shipped to these territories on a high rate of freight and sold in competition with woods from other regions reaching these markets on a lower freight rate and capable of being logged more cheaply. This is a serious handicap to profitable marketing.

On the other hand, we have the formidable competition offered by wood substitutes—fiber products, stucco, tile, brick, metal and concrete. These substitutes are rapidly being adapted to modern types of architecture and other uses formerly held by wood. The material used in the manufacture of a product—whether it be a home, refrigerator or a soap box—is generally of secondary importance to the item of cost. Substitutes are having a marked influence on the demand for and the price of lumber and will continue to have in the future.

Within the industry, conditions have been such the last year or so that profits have been nearly eliminated. In many cases, particularly operations manufacturing a large percentage of mixed woods and carrying large investments in timber lands, business has been done at a loss. While the volume of business

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THE IDAHO FORESTRY LAW

By E. W. RENSHAW, '25
Formerly Deputy State Forester

In commenting on the Idaho Forestry Law one should take into consideration the viewpoint of each class of citizen affected. A classification could roughly be made into (1) the lumbermen, (2) landowners of small acreage within a protective district, (3) the irrigationist, (4) the stockmen and (5) the public at large.

It is a pretty safe bet that if one were talking to a lumberman about the Forestry Law the main topic of conversation would be brush disposal, compulsory patrol and the powers invested in the State Forester. Talk to a stump rancher or small timber owner and you will be discussing the compulsory patrol feature of the law; if to an irrigationist, the value of timber on the watersheds and what benefits the law provides for this protection.

If we stop to consider the fact that of our forty-eight states only nine have not established some form of active forestry organization, then we can realize how important this form of legislation is. Public opinion is gradually forcing the issue and each state must work out its own solution to the problem.

The Fallon Fire Law

The Fallon Fire Law, enacted in 1907, was the first step in forestry legislation in this state. Briefly, this law provided for the establishment of fire districts, appointment of fire wardens, disposal of slashings, named a closed season, required burning permits and the use of spark arresters and gave police powers to certain officers for the enforcement of the act. The law was weak in some respects and it developed that in the main purpose of the law—the reduction of the fire hazard—it was decidedly inefficient.

Without going into the whys and wherefores of brush disposal, the writer wishes to state that he believes, in 90 per cent of the cases, the only proper manner to dispose of slashing in Idaho is by piling and burning. Broadcast burning was considered top form during the operation of the Fallon Fire Law and as a consequence thousands of acres were converted into legalized fire traps. However, with all its weaknesses and inconsistencies, the Fallon Fire Law was an important step in forestry legislation in Idaho.

The Present Law

The present Forest Law was enacted March 5, 1925, and since that time has been subject to more comment possibly than any other law ever writen into the statutes of Idaho. This law is too well known to require a repetition of its text. A great many have claimed that it was sponsored by, and passed for, the benefit of the large lumber companies.

This has been a form of argument used by not a few individuals and the compulsory patrol section has been cited as a case in point. It has been pointed out that small land owners are assessed forest protection charges

E. W. Renshaw

for the purpose or protecting the timber of the lumber companies. What grounds they may have had in making the above assertion is open to discussion. For example we may select an owner who has a timber claim which some day he expects to sell. It is quite probable that he has been holding this claim for years with this end in view, and each year the State and private agencies or the Forest Service have been giving his timber protec-

tion from fire with no reimbursement whatever from the owner.

The other example is the non-resident owner of cut-over, burned-over or other low value timber land. By reason of its menace to life and property, any fire burning uncontrolled on the above types of lands is considered a public nuisance. The lumber companies nave thousands of aces of this kind of land on which they are now required to pay protection costs. It seems just that the law should provide that every owner shall furnish protection on his own land and that for failure to do so he shall be assessed the average cost of the protection provided.

It is true that some of the large lumber companies gave their support to the Forestry Law, but it is an error to assume that all of them did. At the present time a lumber company in the Panhandle of Idaho has entered into a suit against the State regarding the constitutionality of the law.

The last two years Idaho received Federal aid through the Clarke-McNary Law totaling approximately $26,000 a year and it is expected to be about $41,000 for the fiscal year of 1927. That this fund is available to Idaho is due principally to the rigid policy of protecting cut-over, burned-over and reproducing areas.

The main purpose of the Idaho Forestry Law is for the protection of her forest lands from fire. Twenty-four of its thirty-eight sections are specific in this provision and the remaining fourteen sections are closely correlated. It is a physical impossibility to keep all fires out of our forests, but we can, by education and legislation, reduce man-caused fires to a minimum. Furthermore, by keeping the cut-over land in a less inflammable condition we can give a crew a fighting chance to control a fire once started.

The Lumberman

That section of the Forestry Law which deals with brush disposal has been of prime interest to the lumber companies of Idaho. The lumber business is no exception as business enterprises go and must be operated at a reasonable profit. If piling and burning of slash adds such a cost to logging as to reduce profits very materially other disposal methods must be introduced. The piling and burning policy has been followed on National Forest lands in Idaho for a number of years. It is the recognized standard of the Forest Service. But, it is argued, the Forest Service deducts the cost of disposal from the appraised price of their stumpage. While the State of Idaho does not deduct slash disposal costs from the appraisal yet it requires that all slash resulting from operations on state land must be piled and burned. This provision has been in effect since 1920 and the state has sold timber on this basis up to the present time.

Small Landowner

During the first two years that the law has been in operation it has been the subject of more or less criticism. Some of these criticisms were justified and some were not. To some extent, lack of funds hindered the classification of land and as a consequence a number of people were erroneously assessed for forest protection. Naturally these people felt they were being imposd upon and immediately let themselves be heard from . These were given individual attention and their assessments either cancelled or refunded, but nevertheless a certain amount of unfavorable opinion was started. You might say that in a majority of these cases the Forestry Law was forgiven but the fancied wrong remained a grievance.

Due to a misinterpretation of the law, certain other landowners felt that they were entitled to an exemption from protection charges. These were the ones who could not distinguish the fact that cut-over or burned-over land presents as great a fire hazard, and in many instances a far greater hazard, than green timber. The law says that all land which constitutes a forest fire hazard, whether the timber be living or dead, standing or down, shall be classified as "Forest Land" and given the same protection as merchantable timber. In order to insure a perpetuation of our timber crop and also to safeguard the present merchantable stand, fire must be kept from cut-over land. This entails an expense which must be met and non-resident owners are required to pay the actual cost of protecting such land which they may own. The bone of contention seems to be the relationship between hazard and value. Fire recognizes no differences and jeopardizes life and property indiscriminately on any type of area. On the other hand if the law proves itself confiscatory in this respect, remedial measures will have to be considered.

To relieve the burden on cut-over and burned-over land, a plan has been adopted by the State Cooperative Board of Forestry to apply Clarke-McNary funds exclusively to this type

of land so that non-members within Association boundaries will have their assessments on cut-over, burned-over and reproducing areas lowered to a maximum protection charge of 6 cents per acre.

The Irrigationist

Many articles have been written on the relation of the forests to the conservation of irrigation water supply. These articles are the result of extensive study covering a period of many years and show conclusively that a sustained stream flow on the lower levels are, to a marked degree, dependent on the vegetative ground cover in the mountains. To anyone relying on irrigation for the production of crops, the protection of Idaho's forests is of vital importance. In many instances timber which has a high protection value to stream flow has no value whatever commercially. It is fortunate that these protection forests are for the most part within National Forest boundaries and so have enjoyed protection which it is doubtful they would have received before the enactment of the present Forestry Law. The law now provides for such protection over the entire state.

The Stockman

The fact that within the forests of Idaho, over a million and a half head of livestock are grazed each summer indicates the importance of this forest range to the livestock industry. It is possible for fire to damage forage in several different ways. The surface fire, for instance, ruins the range for the year, it may even burn the grass roots thereby causing a further delay in the recovery of the range. The opinion held by some that summer range is benefited by fire because of the forage value of the fireweed which immediately appears, is not well founded. It is true that fireweed makes an excellent forage for sheep, but the fireweed is not a permanent plant. It comes for a year, or possibly two, and then disappears leaving the range much worse than before. Most everyone knows of the injury to browse caused by fire.

Burning Permits

Dissatisfaction has sprung up in a few localities over that part of the law which requires a permit to burn brush during the closed season. This criticism is entirely unjustified and viewed from an unselfish angle this section of the law discloses many good points. Getting a permit to burn reminds the permittee of his obligations in burning, thereby protecting adjoining property; it lets the local fire warden know where and at what time the burning will take place so that he may keep his eye on it; it does away with any needless moving about of the protective organization personnel, and last but most important of all it gives the fire warden a chance to refuse a permit if the hazard is too great for a brush fire at that time of the year.

The Public

What do forests mean to the people of Idaho? Why should every citizen be concerned in protecting them? Because lumbering ranks first among the manufacturing industries of the state thereby providing a home market for enormous quantities of farm products; it employs thousands of persons and pays annually a million and a half dollars in taxes. Furthermore, an obligation to future generations demands that we interest ourselves in the continuity of our timber supply.

The public at large should study Idaho's Forestry Law, should study the existing conditions which brought about its enactment, should recognize the stupendous importance of Idaho's forests to each individual within the state, and following this study, if the law is found superfluous or inadequate, constructive changes or additions can more intelligently be made.

It is well to ever keep in mind the Declaration of Policy of the State Cooperative Board of Forestry, which, in part, reads, " . . . that the said law shall be administered for the purpose of promoting reforestation so as to insure a continuation of the timber crop; of protecting the grazing areas of the State for the benefit of the livestock industry; of protecting the watersheds, which are vital to the success of farming, irrigation, water power development, and the continuity and purity of a domestic water supply; of providing for the proper disposal of brush and waste in timber operations, so as to reduce the recurring fire hazard to all forest land and other property adjacent thereto; and of fostering the business of the manufacture of lumber and lumber products;

BE IT FURTHER RESOLVED, That the said law, and the foregoing policies be administered with a due regard to the complete development of the material resources of the State, and the preservation of the health and property of its inhabitants."

FORESTRY EDUCATION AT YALE

By R. C. BRYANT
Professor of Lumbering, Yale Forest School

The School of Forestry at Yale was founded in 1900, through the generosity of Gifford Pinchot, Chief of the Bureau of Forestry in the Department of Agriculture, and other members of his immediate family. In his capacity as the directing head of Federal forest work, Mr. Pinchot visualized the need for a force of technically trained men who not only could educate the public to the urgent need for a forest policy for the United States but who also could develop and apply the principles of forest management. Previous to 1900 the only trained foresters in this country were a few men trained in European schools, the first forest school on the American continent being established in 1898 at Cornell University and the first graduating class being that of 1900. The Cornell school was closed in 1903 leaving the Yale School as the sole active pioneer in the field of forest education.

The Yale School of Forestry has functioned, uninterruptedly, as a graduate school, the entrance requirements calling for an undergraduate degree and a previous training in those collegiate subjects considered necessary as basis for a technical forestry training.

The original intention of the founders was to provide a training in professional forestry which would equip men chiefly for public service because at that time the greatest need for trained foresters was in that field. Public service then was represented chiefly by association with the Bureau of Forestry of the U. S. Department of Agriculture, and later with the Forest Service of the same Department. The contribution of Yale to national forestry is indicated by the service record of her graduates. Since 1898 the direction of Federal forestry in the Department of Agriculture has been in the hands of Yale men, Mr. Pinchot being succeeded in 1910 by Henry S. Graves at that time, and also since 1922, Dean of the Yale School, who in turn was succeeded in 1920 by W. B. Greeley, the present forester, a graduate of the school. Fifty-five per cent of all of the Yale graduates at some time or other have been connected, actively, with the Federal Forest Service and 20 per cent are now in that service. The graduates of the school have been instrumental in building up and administering many of the state forest departments and in still other states they have served or are serving as members of the technical forest force.

In forestry education, the backbone of every growing profession, Yale men have taken a prominent part serving not only as the directing heads of many of the forest schools but also as members of the faculties.

Students in the School of Forestry during the early years pursued a standard curriculum designed to give a general training which, on graduation, would prepare them for general forestry work or for later specialization in some particular phase of forestry. In recent years, a limited choice of electives has been made available to students in order that they may give more attention to subjects in which they may wish to specialize. It is not the policy, however, to permit the substitution of special courses for those subjects considered as fundamental in a thorough forestry training.

An increasing number of graduates of undergraduate forest schools have entered Yale in recent years to devote an additional year working for a Master's degree in Forestry. The question of whether an additional year in some institution is worth while from the students point of view has been discussed pro and con by the members of the student body of every forest school. The opinions on this subject of two men from widely separated undergraduate schools who recently completed their additional year at Yale is set forth in the April, 1926, issue of the Yale Forest School News.* The conclusions of these two men were that the degree of Master of Forestry was becoming each year more necessary as a qualification for forestry work and that the student who takes such an additional year's work should confine his efforts, chiefly, to some special problem calling for individual thought and effort.

These conclusions coincide very closely with the changes in educational policy inaugurated by the Yale School some years ago to

* Education Beyond the Four-year College Course in Forestry, by J. L. Averill, B. S. Cal. 1924, M. F. Yale 1926, Scandinavian Foundation Fellow 1926-27 and S. T. Huntting, B. S. F. University of Michigan, 1925, M. F. Yale 1926.

meet the needs of one-year students, namely, that such men should be encouraged to pursue special advanced work under the supervision of one or more members of the faculty, rather than reviewing general forestry subjects, in course. During the collegiate year 1926-1927 fourteen men are doing special work chiefly in silviculture, management and soils. Of this number two are from the University of Idaho. Facilities also are available for special work in forest entomology, forest pathology, soils, tropical forestry, and certain phases of forest economics.

The growth in the importance of research work in forestry has created a need for a greater number of men holding the degree of Doctor of Philosophy who have specialized in research methods. The school does not grant this advanced degree but candidates for it may register in the graduate school and major in some phase of forestry under the direct supervision of the Faculty of the School of Forestry. During the present collegiate year five men are so registered, who are chiefly engaged in a study of the plant sciences.

An essential to the proper conduct of advanced work is adequate library facilities and in this respect the school is well equipped. Its library contains much of the current literature on forestry and allied subjects and is especially rich in foreign literature, comprising books and, in some cases, complete sets of foreign forestry journals, which are invaluable to the research student. In addition the libraries of the other scientific departments and also the main University library are available for use by students in the School of Forestry.

Unrivalled facilities are offered for the study of forest management problems in the Eastern United States. The school not only owns and has under management typical areas of second-growth eastern white pine, hardwoods and eastern spruce, but there are available also the holdings of the New Haven Water company, some 12,000 in extent, wh'ch have been managed for more than twenty years under the direction of a member of the faculty.

Students without previous training in forestry who enter the School of Forestry as candidates for the degree of Master of Forestry must show satisfactory evidence that they have received an undergraduate degree in Arts, Science or Engineering and, in addition, have taken courses in the following subjects: at least one full year in Botany, including General Morphyology, Histology and Physiology of Plants; at least one course in Zoology or General Biology, Physics, Inorganic Chemistry, Geology, Economics and Mechanical Drawing; Mathematics through Trigonometry; and French or German. Those who have not received a degree but have completed a minimum of three years of collegiate work, including the required subjects, also may be admitted to the general course provided they can show by certificate or examination that they have received the substantial equivalent of a college training.

Graduates from undergraduate forest schools also may be admitted as candidates for the Master's degree on the completion of one year of resident work. These men usually pursue advanced work and their fitness for admission is determined chiefly on the basis of previous training, scholastic attainments and the submission of evidence that they are fully equipped to carry on, successfully, the specific projects which they desire to undertake. Each case is considered solely on its own merits and arrangements with reference to matriculation must be made previous to the opening of the fall term.

The School has a limited number of free tuition scholarships and loan scholarships which are available to students of high character combined with excellent scholastic standing who are in need of financial assistance. The funds at the disposal of the School for these purposes are inadequate to meet the demand and application for such financial assistance must be made early in the second semester of the collegiate year preceding the students enrollment.

For some years the University of Idaho School of Forestry has been represented in the Yale student body by graduates who have done superior work and we hope that the close relations which now exist may continue in the future.

PARTIAL CUTTING AND STIMULATED GROWTH IN WESTERN WHITE PINE

By C. W. WATSON
Assistant Professor of Forestry

Occurrence of Western White Pine

Western white pine (Pinus monticola) in the United States is limited in its commercial distribution to northern Idaho as far south as the Lochsa divide on the Selway National Forest, and it also spreads out in the Flathead country of western Montana and in the Kaniksu region of north-eastern Washington. Here is the greatest body of white pine timber in the world. Its value as a wood is of the highest. This combined with its comparatively fast growth makes the species the one most to be favored in the forest management of this region, and its perpetuatioin will go far toward encouraging private forestry in north Idaho.

The Problem of Partial Cutting

The logging practices of the western white pine region have, until the present, favored clearcutting and broadcast burning. As a rule the logging left numerous small trees on the areas—the residual stand—these being considered too small to log, and these trees were always killed or consumed in the broadcast burning. The question was raised by foresters and lumbermen as to what this material left after logging would do in the way of growth if it were protected. It was pointed out that broadcast burning did not fireproof an area because, in disposing of the logging slash, the residual stand was killed, and it finally fell, forming a new fire hazard on the ground. In this way many of the broadcast burned areas have reburned many times until they have become brushy and barren. This condition resists complete forest reproduction for several decades.

Those interested favored a proper brush disposal, so as to leave the residual stand alive. This would make logged areas much less of a fire hazard because the brush had been removed, and the remaining green trees would shade the ground, delay the evaporation of moisture therefrom and help to prevent the occurrence of ground fires. They also expressed the belief that the residual stand would respond very quickly to the added light and soil moisture resulting from the removal of the larger trees by logging, and they predicted that this stimulated growth might furnish a good second cut within a few years.

Idaho now has a fire law which stipulates that logging slash shall be completely disposed of by piling and burning. This should solve part of the problem of partial cutting. To the Clearwater Timber Company of Lewiston, Idaho, and to the Idaho School of Forestry belongs the initiative in attacking the question of growth in residual stands of the Idaho white pine type.

The Clearwater Timber Company's Holdings

This company owns about 200,000 acres of the finest white pine timber in Idaho. They have just started to exploit their timber on a tremendous scale, cutting having started in the fall of 1926. Their holdings are solidly blocked, easily accessible by railroad, and the bulk of them lie just south of the North Fork of the Clearwater River in a region of rolling hills where the optimum growing conditions for white pine exist. This operation is of great interest to the forester, because the timber averages about 100 years of age—just such a stand as might result from forest management. Horse logging will be used, and this gives excellent oportunities for good forest practice. Furthermore, the company officials are very sympathetic with the idea of a sustained yield and the practice of forestry on their holdings. If private forestry can ever practiced in Idaho, it should be preeminently successful here.

It is with the idea of informing themselves regarding the possible second cut from residual stands that the Clearwater Timber Company invited the Idaho School of Forestry to carry out the following investigation on their holdings.

The Purpose of the Study

To estimate, in advance of logging, how much timber of various sizes would be left by logging, cutting to an 11 inch diameter limit, i. e. all trees 11 inches and below would be left. The 11 inch limit was chosen because it would leave a good number of trees on the ground, and it was felt that it would not pay to log trees much if any below this limit. A second purpose was to predict what volume of timber could be cut from the residual stands after 35 years. The period of 35 years was chosen because of 35 year leases

which the company holds on some of the timber land.

The Time

The field work was done by the author and five assistants during the summer of 1926.

Methods

The strip cruise was adopted, basing the conclusions on the area actually cruised on the strips as a total rather than to apply them to each forty acre unit as a partial cruise. A strip ½ chain wide was found to be most satisfactory. A wider strip was too much in the young, dense timber. Two strips were run through each forty, one in each half of the forty. On these strips all trees were tallied by diameter classes and species down to a diameter of 2 inches. Calipers were used for diameters. The ages of the stands were obtained by taking three or four borings at the end of each five chain distance on the strip. Distances were measured by trailer tape and topographic abney.

Area Covered

The total length of strip run was 32 miles. This represents a 100% cruise on 128 acres and a 5% cruise of 4 sections.

The Data

The data are presented in a series of seven tables. These tables are all based on a stand table, or average acre, of the entire area actually covered on the strips. In other words, we are dealing only with the timber actually measured—a 100% cruise.

Table one is the original stand table, showing the numbers of trees of the various diameters and species which would be found on an average acre of the area studied. It was compiled by dividing the total stand cruised by the acreage of the cruise. This gave rise to decimals which were retained to two places to promote accuracy in the event that the stand on a larger area might be desired. The table is divided into two parts to show the residual stand and also that which is removed by logging.

Table one shows that in both the residual and in the logged stand the predominating speces is white pine with white fir (Abies grandis) second. The cedar is Thuja plicata, the larch is Larix occidentalis, and the spruce is Picea Engelmanni. The white pine and the white fir are the most rapidly growing species

Table I—The Original Stand

A Stand Table Showing Numbers of Trees Per Average Acre

D. B. H.	Western White Pine	White Fir	Douglas Fir	Cedar	Larch	Lodgepole Pine	Spruce	Totals
2	4.65	12.04	0.39	1.93	0.03	0.13	0.08	19.25
3	2.85	4.88	0.23	0.94	0.01	0.09	0.09	9.09
4	3.74	4.86	0.43	1.30	0.01	0.01	0.11	10.46
5	3.40	2.68	0.36	0.97	0.01	0.01	0.08	7.51
6	5.72	3.80	0.78	1.56	0.05	0.05	0.24	12.20
7	4.37	1.82	0.55	0.97	0.01	0.04	0.05	7.81
8	4.18	1.85	0.81	0.94	0.53	0.08	0.11	8.50
9	5.36	1.75	0.72	1.11	0.08	0.12	0.18	9.32
10	7.24	2.35	0.99	1.39	0.12	0.13	0.13	12.35
11	6.58	2.06	1.00	1.23	0.13	0.11	0.12	11.23
Total	48.09	38.09	6.26	12.34	0.98	0.77	1.19	107.72
Above is the residual stand The following will be removed by logging								
12	5.94	1.80	0.99	1.08	0.14	0.09	0.14	10.18
13	5.86	1.59	1.04	0.89	0.15	0.06	0.10	9.69
14	8.70	2.09	1.62	1.06	0.22	0.03	0.13	13.85
16	8.60	2.18	1.59	1.02	0.35	0.08	0.10	13.92
18	7.70	2.20	1.93	0.54	0.31	0.01	0.04	12.73
20	5.48	1.63	1.11	0.35	0.28	0.01	0.03	8.89
22	6.20	1.35	1.18	0.16	0.15		0.04	9.08
24	4.87	0.96	0.94	0.16	0.13			7.06
26	2.28	0.64	0.52	0.08	0.06			3.58
28	1.47	0.40	0.44	0.04	0.03		0.01	2.39
30	0.45	0.18	0.18	0.01	0.01		0.01	0.84
32	0.18	0.17	0.08	0.02	0.01		0.01	0.47
34	0.12	0.05	0.10	0.02				0.29
36	0.03	0.02	0.04					0.09
38	0.01		0.02					0.03
40		0.01						0.01
Total	57.89	15.27	11.78	5.43	1.84	0.28	0.61	93.10
Grand total	105.98	53.36	18.04	17.77	2.82	1.05	1.80	200.82

of the region from the view point of volume production. It is noteworthy that western hemlock (Tsuga heterophylla)—a common associate of white pine—here is absent. This seems to be the usual condition on a large part of the company's lands. These stands are just reaching maturity. They are mostly 80 to 100 years in age. Some small areas are 60 to 80 years old, but these are of comparatively limited area. The forest is one which has arisen after an old fire—a condition encouraging a large percentage of white pine in the stand—and it is of great uniformity in composition and growth. The density is high and uniform, the trees are still making fine growth, and the site varies from I to II but is mostly I. The forest floor is comparatively clear of underbrush.

Table II shows the volumes for the stand table, segregated into the volume to remain in the residual stand, the volume to be removed by logging and the total. In the residual stand 7 inches was taken as the minimum merchantable diameter. A top diameter of 6 inches was used. Volumes were figured with the aid of the Forest Service Scribner Decimal C tables of District I (western Montana and northern Idaho). An idea of the proper log lengths to use was obtained from measurements of trees felled along the railroad right-of-way which traverses the area studied. In the case of white pine, for example, it showed from one 16 foot log for a 7 inch tree to 10 logs for a 40 inch tree. No allowance is made in the table for rot. There is very little decay in these young stands. It probably runs between one and two percent.

Table II
Showing Volumes in Board Feet Per Average Acre in the Original Stand

	Western White Pine	White Fir	Douglas Fir	Cedar	Larch	Lodgepole Pine	Spruce	Totals
Residual stand	1,382.3	337.7	170.5	159.9	30.7	30.4	27.6	2,139.1
Logged stand	23,753.2	5,642.8	4,298.5	875.9	661.9	56.5	175.7	35,464.5
Total stand	25,135.5	5,980.5	4,469.0	1,035.8	692.6	86.9	203.3	37,603.6

The total volume—37,603 feet—is low for a mature white pine stand growing on the best sites. This figure, however, is the average for four sections, and the stands are hardly mature. The maximum production on the best sites will run from 80,000 to 100,000 board feet per acre. From the point of volume in board feet, the material left in the residual stand is about 6% of the entire volume, and the same ratio holds for the white pine alone.

Table III
Table of Mean Annual Diameter Growth as the Result of Stimulation by Logging

Mean Annual Diameter Growth in Inches

D. B. H.	Western White Pine	White Fir	Douglas Fir and Larch	Lodgepole Pine	Spruce	Cedar
1	0.18	0.16	0.18	0.16	0.18	0.18
2	0.18	0.15	0.16	0.14	0.17	0.17
3	0.17	0.14	0.14	0.13	0.16	0.16
4	0.15	0.15	0.13	0.12	0.16	0.15
5	0.15	0.15	0.12	0.11	0.15	0.15
6	0.16	0.16	0.11	0.10	0.15	0.14
7	0.18	0.16	0.11	0.10	0.14	0.14
8	0.18	0.16	0.10	0.09	0.14	0.13
9	0.19	0.16	0.10	0.09	0.14	0.12
10	0.19	0.15	0.10	0.08	0.13	0.12
11	0.19	0.15	0.09	0.08	0.13	0.12
12	0.20	0.14	0.09	0.08	0.13	0.11
No. trees	230	116	129	20	19	36

Stimulated Growth in the Residual Stand

Some difficulty was experienced in finding a basis for prediction of stimulated growth in the residual stand. A very meagre amount of

(Continued on Page 42)

THE RELATION OF THE VIABILITY OF SEED TO THE AGE OF THE PARENT TREE

By GALEN W. PIKE, '27

To determine the relation of germination capacity and energy to age in Western Yellow Pine, and to eliminate as far as possible all factors other than age which may affect this percent is the object of this paper.

Review of Previous Investigations

A French investigator, working with Pinus silvestris, fifteen, twenty, and twenty five years of age obtained no definite results to show the effect of the age of the parent tree transmitted to the seedling. (1).

E. N. Munns in working with Pinus Jeffreyi found no relation between the germination factor and the position in the cone from which the seed was taken. He found a decided decline in the germination percent with a decrease in the size of the seed. The seed from the lower part of the crowns germinated first.

G. A. Pearson has made numerous careful studies of yellow pine (Pinus ponderosa) in the Southwest on the Coconino and Tusayan National Forests with very interesting results. He found that the blackjacks gave a much higher germination percent (76%) than the yellow pine (68%). (2). Pearson applies the term "Blackjacks" to young, vigorous trees characterized by a dark, almost black bark. These trees are usually less than 20" D. B. H. and under 200 years of age. "Yellow Pine" he applies to the older trees characterized by a yellowish or reddish brown bark. These trees are usually over 30" D. B H. and over 200 years of age. (3). Classifying the stand according to age, by decades, the germination percent was found to decrease with the increase in years. In a later experiment he found trees below 18" D. B. H. giving a germination percent of 82. 18"-24", D. B. H. giving 84%, 25"-30" D. B. H giving 82%, and those over 30" D. B. H. giving 83%. In this experiment the relation of germination percent to age is not as definite as in the earlier experiment. (4).

Methods

The seed trees were selected from pure yellow pine stands on the Moscow Mountains, near Moscow, Idaho. These stands were all selected from the same site having a southwest exposure, a twelve to twenty degree slope and an elevation of 2500 feet to 2800 feet. The average annual rainfall here is twenty-two inches. The soil is decomposed granite with a thin mixture of Palouse silt loam, a loessal material.

As many trees on this site as could be found of each age class from 0-200+ bearing a normal supply of cones were chosen. Of this number it was necessary to reject those that were damaged or infected in any way, as by fire, lightning, mistletoe, insects, fungi, etc. Only healthy dominant trees with uniform crowns were finally retained and their seed taken. Extreme care was taken in this selection of the trees in order to eliminate all factors, except age, that might have an influence on the viability of the seed. In this manner it was hoped that a simpler comparison of the viability of seed of different aged parent trees could be obtained.

The cones were collected the last week in September. At this time the cones were open and the seed fully mature and beginning to fall. The trees were climbed with the aid of climbing irons and the cones picked from all parts of the crown. In some cases it was necessary to lop branches with a hand axe when the cones could not be reached otherwise. As the cones of each tree were collected, the age of the tree was obtained by use of the Swedish increment borer. The seeds were extracted from the cones by shaking them violently in a canvas, and filed with the number and age of the tree. From twenty-five to forty cones were taken from each tree, this being thought a fairly representative sample.

Germination Tests

The germination tests were made in the University of Idaho greenhouses. The beds were sterilized with steam to destroy any harmful fungi or bacteria that might be present and then dried and thoroughly pulverized, leveled and lightly rolled. No attempt was made to select the individual seeds to be tested, but light, small seeds were planted as well

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1 "Experience on Pepinieres." Bul. Soc. Central Forest.
2 United States Department of Agriculture. F. S. Cir. 196. 1909
3 United States Department of Agriculture. F. S. Cir. 196. 1912.
4 United States Department of Agriculture. F. S. Bul. 1105. 1923.

as the larger ones. The sowing was done carefully by hand, 100 seeds in a row across the beds, and one half an inch of sand was applied over the beds to prevent them from caking and cracking. The beds were watered lightly daily to keep the soil moist. The temperature of the greenhouse was maintained at 68° F. as far as possible. During the month of December it was impossible to maintain this temperature due to the extreme weather and the condition of the greenhouse. For about two weeks the temperature was kept above freezing only with the greatest difficulty.

An inspection of this table shows an average germination period of ninety days, more than twice as long as the time required in investigations conducted by Pearson and by the Savanac Nursery. This is due to the low temperature of the greenhouse during the extreme weather in December, and possibly because the seeds require a short rest period after ripening. The inspection also shows the trees from 120 years to 160 years germinating first. These two age classes also give the highest germination percent. The germination percent has a definite upward trend until the parent trees reach an age of 120 to 160 years where it reaches its maximum. After this age is reached the germination percent decreases with an increase in years.

Tabulation of Data—Comparative Viability of Western Yellow Pine—Idaho

Age Class	Duration of test (days).							Basis (Trees)	Average number of seed per pound
	50	60	70	80	90	100	110		
	Average germination per cent								
0-20	No seed bearing trees found in this age class							—	
21-40	—	8	11	19	23	29	34(1)	5	
41-60	—	—	10	21	28	39	45	4	
61-80	—	—	7	13	22	25	27	2	
81-100	—	—	13	20	27	31	32	3	
101-120	—	3	11	17	29	38	43	5	11,230
121-140	17	21	24	36	51	62	64	3	
141-160	18	21	25	39	47	53	57	4	
161-180	—	—	—	—	—	—	—	—	
200 -	9	14	19	31	35	38	43	2	

Summary

The seed of the trees from 120 years to 160 years old (14"-20" D. B. H.) was found to have a greater viability than that from any other aged parent. Up to this point the viability increased; beyond it, it decreased. This has a direct application in marking yellow pine stands for two or more cutting cycles. These trees, 140 year to 160 years of age, are the most desirable to leave for regeneration of the stand after cutting. The fact that the seed from those trees germinates sooner and more rapidly than that of the other classes in ordinary years is of little importance but in the extraordinary year, when the period favorable to germination is short, a start of a few days may mean the difference between some reproduction and none. It is in these unusual years that this increased germination energy is important.

The older trees yield larger quantities of seed, due to their larger crown space than the younger ones but this is offset by other factors. (2). The 140 to 160 year trees give a higher germination per cent. These trees also give a greater volume increase than the older trees and there is less danger of deterioration and loss before the next cut.

The age classes younger than 120 years to 160 years ordinarily need not be considered for seed purposes because of their small yield of seed and its lower viability. However, these younger trees may be of considerable importance in assisting to seed in blanks in the stand when older trees are not present.

For the above reasons western yellow pine trees from 120 years to 160 years of age are the most desirable to leave for regeneration after cutting.

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1 The youngest tree found bearing seed was 22 years old and gave a germination percent of 37.

2 U. S. D. A. Bulletin No. 1105.

THE BETTER UTILIZATION OF WESTERN WHITE PINE MATCH STOCK

By FAIRLY J. WALRATH, '27

The object of this study is to investigate the practicability of using blue stained material in the manufacture of matches.

There are two distinct groups of fungi which affect wood; namely, wood destroying fungi and stain fungi. It is the latter group with which this paper deals.

Blue stain, which is a blue and black discoloration, affecting the sap-wood of western white pine, does not impair the strength of the wood, but simply discolors the surface, or in severe attacks, discolors all the sapwood. (2) (4). The fungus causing these stains, germinates from a spore, and sends its thread into cells to feed upon starches and sugar, and other cell contents. The thread does not affect the cell wall in any way, so the strength is not impaired by the presence of the blue stain. The stain will start from a little patch and spread all over the surface, and if conditions are favorable, it will go all through the sapwood.

Warm weather and a comparatively high moisture content of the wood favor its growth. Freshly cut lumber that is piled without ample ventilation will cause the best growth of the organism. The fungus can remain dormant for a great length of time in dry boards and then start growing when the moisture content is sufficiently high to permit growth.

The stain may appear within a few hours after the boards are cut, the blue color being produced by the great number of minute threads in the wood tissue. After sufficient food has been collected, the fruiting bodies appear on the surface as hair-like projections. On close examination, each hair is found to have a swollen base in which the spores are produced. Boards showing blue stain when cut, should be piled so that drying will take place as rapidly as possible, in order to prevent further development within the board.

"Souring" of the sap or an acid condition is very conducive to the growth of blue stain fungi, so that dipping in an alkaline solution is one way of preventing its growth.

There are three ways of preventing the growth of blue stain: (3) air seasoning, kiln drying and treating with an antiseptic solution.

While air seasoning is the cheapest means of preventing blue stain, it is very subject to climatic conditions. The minimum time should be used in handling from the cutting of the tree to the piling of the lumber. Ample circulation should be provided for in order to get quick drying.

Kiln Drying

Kiln drying is the only effective method of preventing blue stain. 140° F. maintained for six hours at saturated atmosphere killed the fungus in one- two and four-inch stock. (1) (7).

Steaming, followed by air seasoning, has proven successful in some cases, but it may injure the product by causing case hardening.

Antiseptic Treatment

Sodium carbonate (soda ash) and sodium bicarbonate (baking soda) are the two most commonly used dips in this method of control, which consists in the mechanical or hand dipping of the stock as it comes from the saw, in a chemical solution. This method is not good during continuous rainy spells in the warmer months. A 4% solution of sodium carbonate (37% alkaline) should be used in the dry season, and an 11% solution during wet weather.

In using chemical dips, the following points should be kept in mind:

1. The solutions should be carefully mixed and concentrations kept uniform by means of a hydrometer.
2. The solutions should be heated when applied, the bicarbonate solution not more than 120° F.
3. The stock should be dipped as it comes from the saw.
4. Proper piling should be practiced so as to provide ample circulation in order to insure fast drying. (1) (3).

Method Used

The method used in securing information on the utilization of match stock was the questionnaire method, supplemented by a small amount of experimental work to determine whether blue stained wood could be bleached, and the chemicals that would be most economical. A questionnaire was prepared and sent to thirteen match companies in

the United States, and answers were received from ten.

The questions and digests of the answers are given in the following paragraphs.

Question 1

What are your objections to using blue stained stock for matches?

Eight of the companies answered "appearance." Some went on to explain that the public had been educated to getting a clean white splint and would not accept a mixture of colored ones at the same price. The Lion Match Company, a manufacturer of book matches, stated that they had no objection to blue stain stock and the Diamond Match Company stated that they were using, in certain brands, the small amount of blue stain that came in the match stock planks. Objectionable discoloration of the manufactured product seemed to be the main objection presented by the majority of the manufacturers.

Question 2

Could blue stained stock be used if dyed?

Nine of the manufacturers agree that it would be impracticable to dye the blued material for several reasons. It would be a rather expensive process to segregate the blued material from the clear, as they both appear in the same plank. A demand would have to be created for colored matches. Dyeing may impair the absorbing qualities in the further treatment and impregnation by the paraffin and other preparations.

The Lion Match Company is the one exception, again stating that blued stock can be used.

The consensus of opinion seems to indicate that it would not be practical or desirable to use blued splints after dyeing.

Question 3

Would a shorter length match stem be practical? What would you suggest?

At present there are several length matches on the market; namely, one and seven-eighths two and an eighth and two and three-eighths inches. The shorter length matches are suitable for smokers, etc., where a flame of shorter duration is desirable. But the fact that there are more full length matches sold than any other length, shows that the average person desires the stronger, longer splint, especially for lighting gas and fire, and for other general uses.

Question 4

What would you suggest for research that would be of practical importance and help to you?

This question is rather broad, and some of the replies were also broad. One company suggested research in all branches of the match industry, and another, no more research. But most of them suggested research along the line of finding a substitute for the present match wood. They claim that white pine is getting so high in price that they will have to turn to something less expensive One other company suggested research to find a cheaper method of producing the chemicals Another suggested the elimination of blue stain in lumber to make a great saving in utilization.

Question 5

Would it be practicable to develop a grade of matches, including blued stems only, perhaps at a slightly reduced price?

Most of the companies agreed that it would not be practical, saying that there were some grades of all blued splints on the market now, and they were not going well. Matches are such a cheap article that a slight reduction in price will not induce the public to change their demand. One of the companies said that they might be worked into the penny matches. Another company stated that the cost of segregation was prohibitive, but that a reasonable amount was being worked in at the present time.

Question 6

Any further comment, which is not already included, would be appreciated.

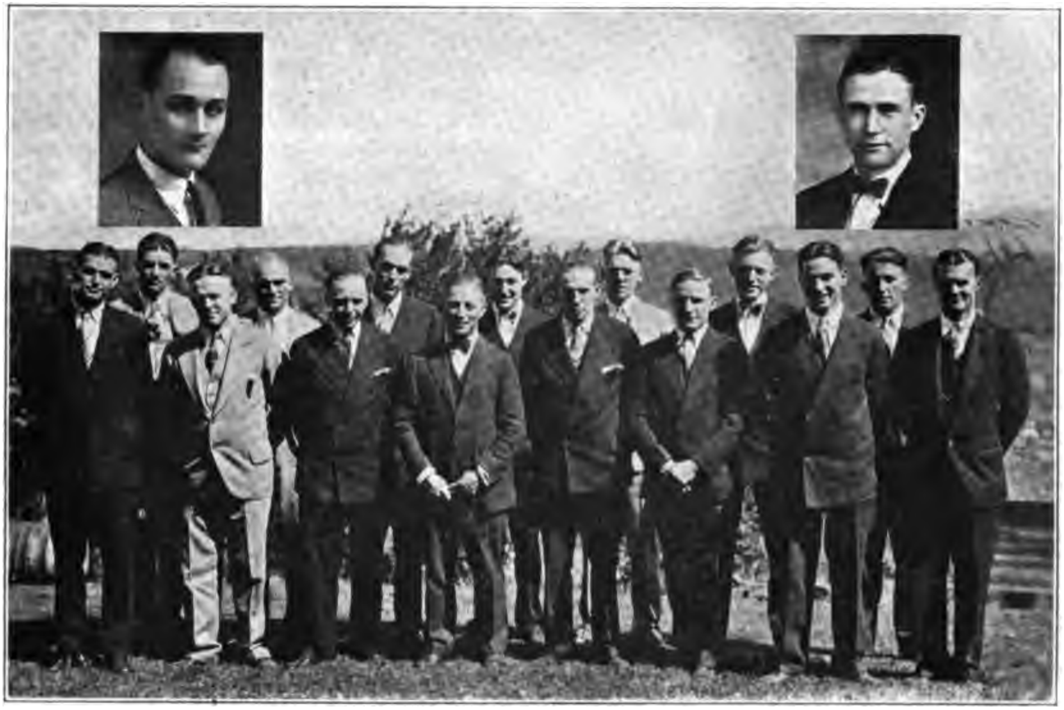
The Republic Match Company was the only one to give anything under this head. It went on to add that "there is a revolution or rather an evolution in firelighting means, like there is in everything else. We have the chemical lighters and various kinds of little devices which do away with the need of matches, and if lumber should be difficult to secure and matches increase in cost, these devices may supercede the industry the same as electricity has replaced the candle and kerosene lamp Even our present day up-to-date auto has an electric cigar lighter."

Experiment to Bleach Blue Stained Stock

An experiment was made to determine if the threads of blue stain could be bleached by a dry gas and still not affect the wood. The splints turned white in about fifteen tubes and dry chlorine gas passed over them. The splints turned white in about fifteen minutes, but when left too long turned brown. indicating that a little of the moisture in the sticks united with the chlorine gas to form

(Continued of Page 38)

CLASS OF 1927



Front row, reading left to right: Sowder, Arthur M.; Phelps, Eugene V.; Beals, Wilfred F.; Lehrbas, Mark M.; Johnston, Royal H.; Godden, Floyd W.; Lansdon, W. H.; Walrath, Fairly J.

Back row: Greene, E. G.; Hoffman, H. C.; Callender, Wm. C.; Burroughs, I. C.; Gustafson, Carl A.; Williams, Guy V.; Space, Jackson.

Left insert: Pike, Galen W. Right insert: Toole, A. W.

Sowder becomes Extension Forester to Idaho; Beals, Godden, Pike, and Gustafson have accepted appointments in the Forest Service, through the junior forester examination; Toole also qualified through the same examination but declined an appointment to accept the office of Deputy State Forester; Lehrbas passed the examination for junior range examiner, but will travel several months before taking an appointment; Phelps, Johnston, Walrath, Greene, Callender, Space, and Williams have all accepted employment with the Clearwater Timber Company; Lansdon takes employment in the mill at Potlatch, Hoffman is to be with the office of Blister Rust Control, and Burroughs will be in military service at Camp Lewis, till August 1st.

ALUMNI

BAUMANN, HERMAN, B. S. (For), '24.

Since graduation Mr. Baumann has been employed as Forester to the Fruit Growers Supply Company, Susanville, Calif. That company is building up a forest policy which Mr. Baumann believes will stand the test of present day economics. The company, with the aid of the Forest Service, expects to place its holdings under permanent management.

BEDWELL, JESSE L., B.S. (For)., '20.

After leaving Idaho Mr. Bedwell did two years of graduate work at Oregon Agricultural College from which he received his M. S. degree in June, 1924. Later he was transferred from the Forest Service to the Bureau of Plant Industry. Mr. Bedwell has been there since as assistant pathologist. His address is 618 Realty Building, Spokane, Wash. Some

time ago he married Lois R. Jones, Idaho student ex '17. He boasts of two fine daughters.

BOLLES, WARREN H., B.S. (For)., '26.

Mr. Bolles is with the Forest Service at McCall, Idaho. Since graduation he has been working on management plans for the Service, and has just completed a management plan for the Meadows Valley Working Circle. He will now have charge of the South Fork Salmon Ranger District.

CARLSON, OSCAR F., '15. Deceased.

CRUZ, EUGEINO de la, B.S. (For)., '26

Mr. Cruz took his Masters Degree from the Yale Forest School this June. Part of the summer he expects to work in Michigan for Henry Ford and then he gives his address as Lingayen, Pangasilan, Philippine Islands. Mr. Cruz this spring passed the civil service for the position of junior forester.

BROWN, FRANK A., B.S. (For)., '22.

In June 1924, Mr. Brown married Pearl Stalker '24. He later entered the College of Dentistry, University of Southern California from which he was graduated this June. He writes "the principle of leverage which I learned while handling a peavy in the Idaho woods has helped me a great deal in mastering the technique of manipulating extracting instruments". His permanent address is given as 308 State Street, Boise, Idaho.

CUMMINGS, LEWIS A., B.S. (For)., '25

Since graduation Cummings has been with the U. S. Forest Service and is now Junior Forester on the Holy Cross National Forest. His address is Glenwood Springs, Colorado. He spent the winter on a timber reconnaissance in Minnesota.

CUNNINGHAM, RUSSELL N., B.S. (For)., '17

Mr. Cunningham is at present with the U. S. Forest Service, Missoula, Montana. His title is Inspector—Fire Cooperation for District

One. His report reads "daughter, born December 1925." Russell is highly respected in forestry and lumbering circles.

DANIELS, ALBERT S., B.S. (For)., '23

Mr. Daniels is now chemist for the Southern Pacific Lines, looking after the wood preservative work of the company on its eastern division. He married Margaret Macey of the class of 1924, June 18, 1924. He tells us he has had little opportunity to see any of the Idaho boys. He recently met Mr. E. O. Siecke, Texas State Forester, who was a student of Dean Miller at one time. Mr. Daniels gives his permanent address as Box 61, Mail Room, Southern Pacific Bldg., Houston, Texas.

DECKER, ARLIE D., B.S. (For)., '13; M.F. Yale '17

Mr. Decker served for three years as instructor in forestry, University of Idaho, and for one year as head of the department of forestry, Washington State College. He was then called by the Potlatch Lumber Company to accept the position of land agent. Later he was placed in charge of the company's extensive cedar pole business with headquarters at Potlatch, Idaho.

DOYLE, IVAN S., B.S. (For)., '26

Altho Mr. Doyle left the school only last year, he is already well established in his work with the Clearwater Timber Co., with headquarters near Pierce, Idaho.

DRISSEN, JOHN PHILLIP, B.S. (For)., '21

After serving for several years as deputy supervisor of forests for the U. S. Indian Service with headquarters at Dulce, New Mexico, Mr. Drissen resigned May 2, to accept a similar appointment on the Yakima Indian Reservation with headquarters at Toppenish, Washington.

FARRELL, JAMES W., B.S. (For)., '22

Farrell is assistant supervisor on the Idaho National Forest with headquarters at McCall, Idaho. He has won distinction for his work on timber sales and management plans.

FAVRE, CLARENCE E., B.S. (For)., M.S. (For)., '15

Mr. Favre has been with the U. S. Forest Service since he was graduated, starting in as assistant forest ranger in Wyoming. Since then he has held the positions of forest ranger, grazing assistant, deputy supervisor, and is now forest supervisor with headquarters at Kemmerer, Wyoming.

FENN, LLOYD A., B.S. (For)., '11

Altho a forester at heart Mr. Fenn is at present an attorney-at-law at Kooskia, Idaho.

Hon. Lloyd A. Fenn

After leaving school he took employment with the Forest Service but later prepared himself to practice law. Fenn has served several terms as a member of the Idaho legislature where he did outstanding work in securing passage of the Idaho Forestry Law.

FIELD, WALTER D., B.S. (For)., '26

General construction work is keeping Mr. Field out of mischief. He is with the Clearwater Timber Company at Pierce, Idaho, and is making excellent progress in his work.

GERRARD, PAUL H., B.S. (For)., '23

At present Mr. Gerrard is assistant forest supervisor of the Clearwater National Forest with headquarters at Orofino, Idaho. He took employment with the Forest Service immediately after he left college, where his work has won him consistent advancement.

GILLHAM, NORMAN F., B.S. (For., '26

The past year Mr. Gillham has spent in his home community in Illinois but returned to the west this spring to locate permanently in forestry work. Incidental to his return, his engagement was announced but he refuses to tell when the wedding will occur. Mr. Gillham has accepted employment with the Clearwater Timber Company, Lewiston, Idaho.

HARLAN, PAUL M., B.S. (For)., '25

Mr. Harlan holds the position of secretary-treasurer to Gas Appliance Society. His address is 54- Powell Street, San Francisco.

HERMAN, CHAS. H., '13

(Will someone please report his address).

HUNTINGTON, COLLIS H., (For)., '26

Immediately after graduation, Huntington accepted employment with the Northern Rocky Mountain Forest Experiment, Missoula, Montana.

JACKSON, TOM, B.S. (For)., '19

Some men are busy and others busier. Mr. Jackson comes in the latter class. He spent one hour in Moscow June 1 on his way to Spokane. He is woods superintendent for the Fruit Growers Supply Co., at Susanville, Calif. Then too he is occupied with more or less general managerial work.

LUNDSTROM, F. J., B.S. (For)., '11

Mr. Lundstrom is employed by the road department of Los Angeles County, California. He gives his address as 1631 N. Harvard Blvd., Los Angeles.

MALHOTRA, DES RAJ, B.S. (For)., '25

Mr. Malhotra holds the important position of Assistant Conservator of Forests to the State of Kashmire, India. His address is Jammu, Kashmire State, India.

MALMSTEN, HARRY E., B.S. (For)., '17

In Mr. Malmsten's report he has the notation "unmarried and teaching courses in forest protection and advanced range management" in the University of California. His address is 1715 Francisco St., Berkeley, and he has the title of assistant professor of forestry.

McLAUGHLIN, ROBERT P., (For)., '25. M. S. Yale, '26.

McLaughlin is assistant professor of forestry, Michigan State College, Lansing.

MELICK, HARVEY IVAN, B.S. (For)., '23.

Nampa, Idaho.

MILLER, WILLIAM BYRON, B.S. (For)., '22. M. S. (For)., California '25.

Mr. Miller is with the U. S. Biological Survey on reindeer investigations at Fairbanks, Alaska. He was married to Attie Johnson of Richfield, Utah, in Salt Lake City, on May 15, 1925. He has been in Alaska since June, 1925. Mr. Miller's most common means of travel is by boat and dog sled. His report carries some most interesting accounts of his work with reindeer and caribou and he has promised us a story at a later date.

MOODY, VIRGIL C., (For)., '17.

He has been in the Forest Service continuously since graduation and his address is U. S. Forest Service, Coeur d'Alene, Idaho.

MUNSON, OSCAR C., B. S. (For)., '21.

Munson is district plant engineer of the northern portion of the coast division of the Pacific Telephone and Telegraph Co. with headquarters at Santa Rosa, California. His home address is 814 Spring Street. He speaks

Class of 1926

Left to right: Sajor, Huntington, Cruz, White, Pugh, Field, Olson, Bolles, Doyle, Walrath.

in particular of the scenic attractions of the Redwood Highway.

NERO, EDWARD T., B. S. (For)., '23.

Business is at present occupying the time of Mr. Nero. He resigned from the U. S. Forest Service a few years ago to go into the store business. His address is Orofino, Idaho.

OLSEN, CLARENCE C., B.S. (For)., '26.

District Ranger is the title Mr. Olsen has with headquarters at Crescent, Oregon. He reports little to do except take care of 400,000 acres of land in his district. Among his duties he mentions marking and scaling timber, timber sales, logging damage studies, land-exchange, surveying the site for Crescent, in charge of eleven sheep and one cattle allotments, three summer resorts, besides innumerable homesites and as "Ole" says "Irish lumberjacks to the north, sagebrush settlers to the east, Klamath Indians south and a forest with nearly 100% Scotch personnel to the west. What chance has a poor Swede got?" Mr. Olsen was married last September to Jeannette Greve, a former Idaho student.

PARSONS, RUSSELL M., B. S. (For)., '24.

The Clearwater Timber Company is taking all of Mr. Parson's time. He is a timber cruiser and camp draftsman, and is making excellent progress in his work.

PATRIE, CARTHON R., B. S. (For)., '22.

After Mr. Patrie graduated he entered the Bureau of Plant Industry (Blister Rust Control) but left this work to enter the Indian Service with headquarters at Klamath Agency, Oregon, where he is now located. His title is that of forest assistant. He was married in 1922.

PUGH, LAWRENCE R., B. S. (For)., '26.

Immediately after Mr. Pugh received his degree he began selling lumber, box shook, etc. His permanent address is Springston, Idaho, but he travels over Idaho, eastern Washington, Utah, Colorado, Wyoming and Montana.

RENSHAW, EMERA WILFRED, B.S. (For)., '25.

For two years after graduating Mr. Renshaw served as deputy state forester to Idaho and only this spring resigned to accept an appointment with the U. S. Forest Service with headquarters at St. Maries, Idaho.

RETTIG, EDWIN C., B. S. (For)., '19.

Mr. Rettig is one who has had considerable experience since graduating. He served as a surveyor and draftsman for the U. S. Forest Service one year, assistant fire warden to the Clearwater Timber Protective Ass'n., also and later cruiser for the Clearwater Timber Co. At present he is land agent for the latter company and his report includes the notation "married."

RUCKWEED, FRED JOHN, B. S. (For)., '17.

Gettysburg Public Schools, Gettysburg, South Dakota.

RYAN, CECIL C., B. S. (For)., '24.

The headquarters of Mr. Ryan are Moscow, Idaho, where he is employed in the office of the city surveyor.

SAJOR, VALENTIN, B. S. (For)., '26, M. S. Yale '27.

Mr. Sajor is planning to spend a few months in Michigan on the Henry Ford operations before he travels back to his home in the Philippine Islands. This spring he passed the civil service examinations for both junior forester and junior range examiner.

SCHOFIELD, WILLIAM R., B. S. (For)., '16.

Topographic engineer and fire chief to the Hammond Lumber Company, Samoa, California, is the present title of Mr. Schofield. He has had a great deal of experience in the engineering field since leaving college besides grazing experience, military work and even engaged in private business. December 28, 1920 he was married to Elizabeth McMillan and they have one son.

SHARMA, PARMISHIRIE DAS, M. S. (For)., '22.

Technical Adviser, Forest Branch, State of Gwalior, India. This is an office of high rank.

SNOW, ELVA A., B. S. (For)., '25.

Mr. Snow is with the Forest Service and holds the position of junior forester. Since leaving school he has been doing timber sale work on the Medicine Bow National Forest at Albany, Wyoming.

SOWDER, ARTHUR M., B. S. (For)., '25, M. S. (For.), '27.

After graduating Mr. Sowder returned to the Edward Rutledge Timber Company logging operations near Clarkia, Idaho, and left there last fall to return to Idaho to complete his work for the Master's degree which he received this June. Only recently Mr. Sowder accepted the appointment as Extension Forester to the State of Idaho and will have his headquarters at Moscow.

SPACE, RALPH S., B. S. (For)., '25.

Mr. Space is a forest ranger at present on the Blockfoot National Forest with headquarters at Kalispell, Montana.

GROUP OF ALUMNI— (See Page 27)

Groupe of Alumni—(See Page 26)

First row (top) reading left to right: Wheaton, R. G., '24; Gilham, Norman F., '26; Decker, A. D., '13; Bauman, Herman, '24; Yates, Donald H., '17.

Second row from top: Malmsten, Harry E., '17; Brown, Frank A., '22; Schofield, W. H., '16; Cunningham, Russell M., '17.

Third row: Lundstrom, F. J., '11; Staples, Howard W., '20; Nero, Ewart, T., '23; Miller, W. Byron, '22.

Fourth row: Rettig, E. C., '19; Wadsworth, H. A., '11; Patrie, C. R., '22; Drissen, J. P., '21.

Fifth row: Jackson, Tom B., '19; and Parsons, Russell M., '24.

Sixth row (bottom): Daniels, A. S., '23; Bedwell, J. L., '20; Favre, C. E., '14; Ryan, C. C., '24; Gerrard, Paul H., '23.

STAPLES, HOWARD W., B. S. (For)., '20.

Mr. Staples, after serving several years as resident manager of the Yukon Gold Company at Murray, Idaho, recently signed and will return to the Forest Service. His address is Moscow, Idaho.

STEVENS, ARTHUR W., B. S. (For)., '11.

Mr. Stevens is now with the Anaconda Copper Mining Co., as surveyor and draftsman, at Great Falls, Montana. His Company is making a detailed survey of its equipment and buildings and he tells us the project covered a six months' period.

WADSWORTH, HERBERT ALONZO, B. S. (For)., '11.

Major, U. S. Infantry, Fort Howard, Maryland.

WHEATON, RODGERS G., B. S. (For)., '24, M. F., Yale '25.

Mr. Wheaton accepted an appointment with the U. S. Forest Service immediately after leaving Yale but more recently he has been employed in the capacity of a district forester, by the North Carolina forestry division. His present address is 316 Jackson Building, Asheville, North Carolina.

WHITE, HAROLD Z., B. S. (For)., '26.

After graduation Mr. White entered the employ of the Clearwater Timber Company at Pierce, Idaho. In January he was sent to study kiln drying of lumber at the Potlatch Lumber Company so that he could take charge of the kiln drying operations of the new Clearwater Timber Company's mill which is under construction. In the early part of June he made a tour of inspection of some of the large mills on the Pacific Coast.

YATES, DONALD R., B. S. (For) '17.

Yates is flourishing in the real estate business with headquarters at 714 Holland Bldg., Seattle, Wash.

YOUNGS, HOMER S., '17. Deceased.

PERSONAL MENTION

Dean Graves Visits the School

We were greatly delighted with a visit from Dean Henry S. Graves of the Yale Forest School, on Arpil 26th and 27th. He addressed the School of Forestry, including the faculty, student body, and several invited friends from out of town, the morning of April 27th upon his impressions of the field and opportunity of the forester. He cited as an example of what the forester may do to create favorable sentiment for forestry, the roadside planting now being done in Connecticut as the result of organized effort on the part of Connecticut foresters. Incidentally, one of the results is the driving of the obnoxious bill board from the public highway, for with trees placed at intervals along highways, bill board advertising becomes undesirable. In short, what Dean Graves wanted to impress upon his hearers was that often work seemingly not germane to forestry, may be of greater importance in promoting forestry than work along strictly conventional lines.

Dean Graves held two conferences with the forest faculty during the course of his visit, in which matters of policy in forestry education were discussed, as well as the part the forest schools should play in forest research.

He was the principal speaker at the noon luncheon of the Moscow Chamber of Commerce, and had given the main address at a community banquet in Lewiston the evening before.

Series of Lectures by Gisborne

In March, last, the School of Forestry enjoyed a series of lectures by Mr. H. T. Gisborne, silviculturist of the Northern Rocky Mountain Forest Experiment Station. He touched upon a variety of subjects, but

throughout his series, he stressed the importance of forest research as a factor in the solution of many of our forest problems. The course was most favorably received.

Myrick Transferred

Mr. E. H. Myrick has been transferred from the forest supervisorship of the Lewis and Clark National Forest at Chateau, Montana to the forest supervisorship of the St. Joe National Forest, with headquarters at St. Maries, Idaho.

New Instructor in Forestry

With the opening of the year last September, a new instructor in forestry, in the person of Mr. E. G. Wiesehuegel, was added to the staff, making five men giving full time to the work of the School.

Mr. Wiesehuegel comes to his new position with a good background in both training and practical experience. He was graduated from the School of Forestry, University of Michigan, in 1922 with the degree of Bachelor of Science in Forestry, but had meanwhile completed

E. G. Wiesehuegel

several months of post graduate work. In recognition of his proficiency in botany he was elected to membership in the Phi Sigma National Honorary Biological Society.

Soon after graduation, Mr. Wiesehuegel accepted an appointment from the U. S. Forest Service and was assigned to various fields of work from time to time, in District 4. In his first year with the School of Forestry, he has proven himself to be an excellent teacher as well as a man of more than ordinary promise in forest research. The School is fortunate in securing his services.

Seniors Hear Mr. Hermann

On the morning of April 13th, the seniors listened to an address by Mr. Albert Hermann who heads the research department of the Western Pine Manufacturers Association, Portland, Oregon. He explained that his association had not been able to get the required service in all respects from research organizations already existing, hence had organized a research department of its own. He believes one of the big steps ahead in forestry is in the field of forest research.

Mr. Olson Addresses Foresters

At their meeting the evening of April 20th, the Associated Foresters had, as their speaker, Mr. D. S. Olson, in charge of planting, District 1. His subject was, "Seed Collecting", and he told in a most interesting way of the part squirrels play in this operation, since one of the easiest ways to gather the cones is to rob squirrel caches. Mr. Olson was here at the invitation of the School, primarily to advise with reference to the development of the new forest nursery.

Geo. M. Cornwall, a Notable Visitor

In the early part of the first semester, Geo. M. Cornwall, Editor of the Timberman, paid the School a most welcome visit. He addressed the students of forestry in the afternoon and the Xi Sigma Pi, at a dinner given in his honor, in the evening. Mr. Cornwall was leaving in a few days for an extended trip to foreign countries, including Australia.

A card was recently received from him dated May 25, Honolulu, in which he stated he was then on his homeward voyage. The School is always glad to welcome Mr. Cornwall.

School Again Makes Good Record in Civil Service Examination

The school was again proud of its record this spring in the civil service examination when it learned that five out of seven had passed the examination for the position of junior forester, and four out of five passed the examination for the position of junior range examiner.

TREES ON THE IDAHO CAMPUS

By C. L. PRICE*
Forestry Nurseryman

The trees on the campus of the University of Idaho, Moscow, have become so much a part of our lives that those of us who pass by them daily scarcely realize their existence yet were they suddenly to be removed we would immediately clamor for their replacement. They add very materially to the beauty of our campus and assist greatly in forming a most suitable environment for the education of the young men and women of the state.

Of the 136 species of trees growing on the University of Idaho campus many are not indigenous to this part of the United States and not a few are native only to Europe or the Far East. All foreign species, however, are making good growth with few exceptions and these make good progress during years of suitable growing conditions. It can hardly be expected that a tree native to a tropical climate could equal the growth of one whose range is confined only to our own temperate conditions. However, there is little discrimination in the care of the many varieties so that the Ginkgo tree from China is growing beside the redwood from California and the eastern white pines from the state of Maine are sharing the ground with the Russian poplars or the Austrian pines from Europe, making our campus tree growth very cosmopolitan.

The slope, south and a little west of MacLean Athletic Field, covered with tree growth is known as the forest nursery and it is here that the vast majority of the campus trees are planted and grown. The School of Forestry of the University is responsible for the forest nursery and distributes to all parts of the state over a couple hundred thousand trees annually.

* Editor's Note: Mr. Price came to the University of Idaho in 1909 as Forest Nurseryman at a time when there was but very little tree growth on the campus. Practically all of the trees now growing about the university grounds have been planted by him or under his supervision.

Presidential Trees—(See last paragraph of this article)

Historic Trees on the Campus

To perpetuate the memory of three distinguished guests of the University of Idaho who have visited the campus from time to time three trees have been planted during their visits. One tree is designated as the "Roosevelt Tree", another the "Taft Tree" and a third the "Marshall Tree", each forming the point of a triangle and about 30 feet apart. These trees are all healthy growing specimens as shown by the accompanying photograph. They are standing about 150 feet east and 100 feet south of the main entrance of the Administration Building.

The first of these trees to be planted was the "Roosevelt Tree" in honor of Theodore Roosevelt, former president of the United States. This tree is a Coloralo blue spruce and was planted April 10, 1911. It is undoubtedly the best specimen of this tree to be found on the campus and now reaches a height of about fifteen feet. It was five years old when our former president threw the first shovel of earth about its roots.

The second of this group of trees to be planted was the "Taft Tree", a Port Orford cedar. It commemorates the visit October 4, 1911 of William Howard Taft, then chief executive of the United States. The tree was five years old then and only about three feet high. Now it is fully fifteen feet high. Just why the Colorado blue spruce and the Port Orford cedar were chosen to be planted by Roosevelt and Taft respectively is not definitely known.

The third corner of the tree triangle is called the "Marshall Tree" and was planted November 17, 1917 by Vice-President Thomas R. Marshall. Since Indiana was his home the red oak, a tree native to that state, was chosen. It has made excellent growth since it was planted—then a small seedling—and it now reaches a height of fifteen feet. The shovels used by these three distinguished guests of the university in planting their respective trees are on display in the museum shelf in the main library of the Administration Building.

A View of the Nursery and Arboretum

Memorial Grove for World War Heroes

In honor of University of Idaho students who lost their lives in the World War, a Memorial Grove, consisting of one tree in memory of each man, was established on the campus. The planting was made in the spring of 1919 and on the slope just south of the Administration Building, about 150 feet away. Thirty-two former Idaho students made the supreme sacrifice and that number of trees was planted to perpetuate the memory of these heroes. These trees consist of 22 evergreens and ten hardwood trees. The evergreens are Norway spruce, Englemann spruce and Colorado blue spruce and the hardwoods are all red oak. About one year after the planting or on May 30, 1920, Decoration Day, dedication services were held. A bronze plaque bearing the name of each man is hanging in the north end of the hall of the first floor of the Administration Building.

Trees are often planted for protection from the wind and a good example of this on our own campus is the evergreen windbreak south of the Gymnasium, between that building and the tennis courts. The species of trees making up this planting include the Austrian, Scotch and jack pines for the most part but

intermingled with these are some Norway spruce and Douglas fir trees. The benefit of this windbreak is distinctly felt in walking between the Gymnasium and the Administration Building on days of a severe westerly wind. This windbreak was established in 1916 and in the ten years of its existence some of the trees, especially the Scotch pines, have attained a height of 20 feet.

In no other way can the beauty, usefulness and attractiveness of our campus be improved and secured so cheaply, easily and satisfactorily as by the planting of trees. Joyce Kilmer in his poem "Trees" paid a fine tribute to this form of plant life when he wrote:

I think that I shall never see
A poem lovely as a tree.
A tree whose hungry mouth is prest
Against the Earth's sweet flowing breast.
A tree that looks at God all day
And lifts her leafy arms to pray.
A tree that may in summer wear
A nest of robins in her hair.
Upon whose bosom snow has lain;
Who ultimately lives with rain.
Poems are made by fools like me,
But only God can make a tree.

Presidential Trees

The Port Orford Cedar planted by Taft is shown in the right foreground and the Colorado Blue Spruce to the left is the Roosevelt Tree. The third corner of the tree triangle or the Red Oak planted by Marshall is just beyond the left edge of the photograph. The Memorial Grove is about on a line between the Taft Tree and the "I" water tank, a little to the right of center and on the slope just above the university flower garden which is also shown in the photograph.

PRIVATE FORESTRY IN IDAHO

(Continued from Page 8)

was fair, the price received has put the balance sheet in the red.

The present cause of distress is generally conceded to be a matter of over-production. There has been in recent years a marked over-development in both milling and logging facilities, with the result that, if operated economically at near capacity, there is a surplus of stock. Also we have concerns which, on account of financial distress, are forced to liquidate to meet floating debts, bond interest and short maturing paper and to effect economies in taxes and carrying charges. Under conditions where there is little or no profit in the conversion of virgin timber, there is little incentive for changes in cutting and logging methods which would place additional expense on the operation. This added expense must be defrayed out of current profits.

The present application of the general property tax to forests and forest lands is conceded by tax economists to be unequitable and unsound. The position of the timber grower is unique in that it is the only enterprise forced to pay annual taxes many years in advance of any income from lands so taxed. The ever increasing tax burden, in meeting the public demand for better schools, highways and public improvements, has had a profound influence in hastening the cutting of mature timber and discouraging the holding of lands for reforestation. Under existing conditions little relief is in sight.

There is also the attitude of taxing boards and the public generally toward corporate ownership. The weird and fantastic boundaries of school and highway districts in timbered regions evidence the determined effort to force taxes on this class of ownership without regard to benefits accruing to those who pay the bill. Within the counties there is a constant tendency to keep shifting the tax burden to corporate ownership for political expediency. Many of these political sub-divisions in Idaho have now reached a point where long term bonds have been issued to the statutory limit. In many cases the virgin timber will be cut before maturity of the bonds with the result that the owners of the logged-off land will be forced to retire the indebtedness.

In addition to these handicaps confronting forestry enterprises there are the uncertainties of future timber values, future legislative trends and the ever present risks of fires, insects and disease. Likewise, we have the bugaboo of the compound interest table with its terrifying results when extended over long rotation periods at current rates of interest.

The real crux of the forestry probem in Idaho at the present time is "Slash Disposal." Lumbermen and foresters are practically unanimous in this conclusion. It is necessary that slash incident to logging be disposed of for the purpose of reducing fire hazard, but it is not essential wholly from a silvicultural standpoint.

Idaho Forestry Law

The Idaho Forestry Law of 1925 is based upon the requirements of compulsory slash disposal and fire protection. It provides that slash created in logging "shall be piled and

burned", unless other methods of disposal are authorized by the State Forester. The system of broadcast burning is very objectionable; but, the piling and burning requirement in the denser stands is costly in its application and in some cases greatly out of proportion to the values involved. At the same time the results obtained are often discouraging. Fire, when used under the most favorable conditions, is treacherous.

Naturally the law has had some opposition, but, however, it was a progressive step and has brought beneficial results in emphasizing upon the private owner his responsibility with reference to slash hazard and forest protection. Coincident with this, it has stimulated thought and action in the industry and actively set it to work upon the problem.

We have focused sufficiently upon the deterrent factors confronting the issue and it is reasonable to assume that, by reason of the impetus back of the movement, these adverse conditions will be met frankly and open-mindedly by private and public interests. Practical solutions will be worked out as in the past.

Swing Toward Silviculture

The swing to meet silvicultural demands will, however, be slow and carried only to the point where logging costs can be increased and still meet competition. These developments in Idaho will naturally follow like developments in competing regions where economic conditions are more favorable.

The fact must not be overlooked that the successful operation of any reforestation policy will largely depend upon the logger for its execution. The policy adopted will necessarily have to be a compromise with his problems. It is not enough to send him red penciled copies of forestry laws and regulations. He must have an appreciative knowledge of the objective to be attained and be in accord with the program.

There is reason to believe that the future of forestry by private enterprise in Idaho is hopeful. The present interest shown in the subject and the results obtained by crude forestry practises in the past would warrant this assertion. It is significant that managers, woods superintendents and men in the woods are discussing the proposition and consultation with foresters and forest economists is being sought.

With favorable economic developments and a fuller realization and more common understanding that the interest of the public is concurrent with the interest of the private owner in any reforestation program, striking and encouraging trends will take definite form.

IDAHO FOREST SCHOOL EXPANDS ITS NURSERY

The lease of a twenty-seven acre tract gives the School of Forestry about forty acres for its forest nursery and arboretum. The most of this area will eventually be used for forest nursery purposes, and when fully developed the School will have one of the largest state controlled forest nurseries in the west.

The newly acquired leasehold adjoins the city limits of Moscow on the south and the university campus on the east. The east end abuts the North and South Highway. In point of situation, soil and topography the tract is splendidly adapted to forest nursery purposes. Being adjacent to the campus, it will be an inexpensive matter to supply this tract with water from the university system. The water system is now being installed.

The tract will be used primarily to grow planting stock for the establishment of farm woodlots, shelterbelts and windbreaks under a cooperative agreement between the School of Forestry and the U. S. Forest Service according to the terms of the federal law known as the Clarke-McNary Act. This agreement will make it possible for the School to supply the farmers of the state with planting material at very nominal prices.

Since all the tract will not be needed at once to grow nursery stock a part of it will be used meanwhile to demonstrate methods of establishing and growing type woodlots and windbreaks. Eight or ten acres will be used for these purposes.

The securing of this fine piece of ground will make it possible for the School to meet the demands for forest planting stock quite indefinitely as the nursery may now be gradually enlarged till it will eventually have an annual capacity of a good many millions of trees.

It is especially desired to encourage windbreak, shelterbelt and woodlot planting. The growing of shade trees will also be put on a much larger scale in order to give the public better service in ornamental planting.

THE ASSOCIATED FORESTERS

By F. W. GODDEN, '27

The modern trend in all lines of activity is organization of one kind or another, and in keeping with such a trend the students of forestry in the University have organized a club called the Associated Foresters, composed of students of forestry and Forest School faculty members.

The primary objectives in organizing this club was to make possible closer fellowship among the forestry students by conducting a definite social program during each school year, by holding club meetings periodically, and by affording the foresters a means of expressing themselves regarding plans of the school.

The club meetings are gatherings which all of the students attend and at which topics of interest to foresters are discussed. Quite frequently speakers from the Forest Service and other branches of the profession are obtained to talk to the group. The gatherings are usually terminated with a "feed" in the Club Room.

The Club also provides a number of pictures, maps, game mounts, and magazines in the Club Room to make it an enjoyable place for the students to gather and study or visit.

The social program sponsored by the club in the past has been four major events, a dance, a smoker, a banquet, and a barbecue.

The first of these events held during the past year was an all college dance given at the Blue Bucket Inn on Hallowe'en Eve. This was a very attractive dance with decorations of cedar boughs and Hallowe'en suggestions. The only regrettable feature about the Foresters' Ball was the limited capacity of the hall since more people wished to attend than could be accommodated.

Associated Foresters, 1926-27

The second event on the social calendar was the Smoker, held in the gymnasium during the winter. A variety of boxing, wrestling, and tumbling events, chalk artistry, music, and special features filled the early part of the program while the remaining portion was a big feed and the "smokes".

The third and most elaborate event, the Banquet, was held March 17 at the Blue Bucket Inn. This was a very enjoyable affair attended by all of the students of forestry, Forest School faculty members, and a number of guests from the Forest Service,

Inland Empire lumbermen, Moscow citizens, and the University faculty. A wonderful dinner was served, after which, Toastmaster Hubert and the speakers for the occasion gave a very enjoyable program of humorous and serious talks.

Last but not least on the Club's program of functions to secure unity and fellowship among the students is to provide a means of expression for the foresters on the campus through the University paper and other publications. This is secured in part through a publicity man who serves as a reporter and writes up all activities of the foresters and turns them in to the editors. Space is also obtained in the Gem of the Mountains, the university annual, where the forester's group picture appears with a roll of all foresters attending the University.

Further publicity is obtained through this magazine, which as all the readers know, is published by the Associated Foresters.

Considered in all of its aspects the Forest Club is a big factor in the student life of the foresters at Idaho since it provides recreation and a means of unifying the student body.

WHAT THE BOYS WILL BE DOING THIS SUMMER

Milton Anderson and Russell LeBarron are to be stationed at the Honeysuckle Ranger Station near Coeur d'Alene, Idaho.

Fred S. Auger and Charley Langer will be working for the Clearwater Timber Company at Pierce, Idaho.

Donald H. Axtell, Selway National Forest, Kooskia, Idaho.

John C. Baird is going to the R. O. T. C. Summer Camps at Fort George Wright and will afterwards accept a junior range examiner appointment in Wyoming. Address S.A.E. Moscow, Idaho.

Prentice Balch, Henry Hoffman, Percy Rowe, Jack Hume, Gordon Flack and "Al" Cochran will be in charge of reconnaissance crews for the Office of Blister Rust Control 618 Realty Bldg., Spokane, Wash.

Cary H. Bennett, address c/o School of Forestry, Moscow. He will be on investigative work for the School of Forestry.

John B. Biker, has accepted employment with the West Kootenay Power and Light Co., Nelson, B. C.

Buford C. Boyd, will be stationed at the Dixie Ranger Station, Nezperce Forest, Grangeville, Idaho. The work will consist mostly of trail construction.

T. Stewart Buchanan, Morton, Washington.

Arthur Buckingham is an assistant ranger on the Clearwater National Forest. Address, Orofino, Idaho.

Leslie Burton, will build trail at the Red River Ranger Station, Elk City, Idaho.

Howard C. Cherry, 87 North St., Blackfoot, Idaho.

William Coleman, Cascade, Idaho.

Charles A. Connaughton is on timber survey work on the Boise National Forest, Boise, Idaho.

Geo. A. Criser will be a patrolman on the Challis Forest, Challis, Idaho.

Lyman D. Crosthwait is getting up in the world this summer on a lookout at Foam Creek Ranger Station, Challis, Idaho.

John A. Croy, Clarkston, Wn.

Robert Davis is on timber survey work with the School of Forestry in the Clearwater region.

Gordon Ellis will be engaged this summer on grazing reconnaissance on the Jefferson Forest, Martendale, Montana.

Herman Ficke, Payette, Idaho.

George M. Fisher is on blister rust work. Address 618 Realty Building, Spokane Washington.

Norman B. Forester may find a forester's life has its difficulties, as chasing smoke on the Clearwater offers a variety of experiences.

Leo M. Frost will make forage and timber appraisals for the Forest Service at Coram, Montana.

George A. Garmo will be on the Selway National Forest, stationed at Howell, Idaho.

C. W. Goodwin will spend the summer at his home, 116 Monticello Ave., Piedmont, Calif.

Chas. A. Gregory, R.O.T.C. Summer Camp Fort George Wright, 5712 N. Virginia Ave., Spokane, Washington.

Andrew G. Halverson, Kimberly, Idaho.

Alden B. Hatch will be with the Northern Rocky Mountain Forest Experiment Station. His address is Priest River, Idaho.

Tracy L. Heggie has accepted an appointment as junior range examiner at Albuquerque, New Mexico.

Geo. V. Hjort, Moscow, Idaho.

James Hockaday, will be on construction work on the Sawtooth National Forest, Hailey, Idaho.

Primo E. Icarangal is ill in a hospital at Portland, Oregon.

George J. Illichevsky is with the Office of Blister Rust Control, 618 Realty Building, Spokane, Washington.

George M. Jemison will be on trail crew work at Magee Ranger Station, Coeur d'Alene, Idaho.

Dean C. Kaylor is going up to the land of the Eskimo this summer. He may be reached at Petersburg, Alaska.

Fred H. Kennedy has accepted work on a timber survey on the Boise National Forest, Boise, Idaho.

William T. Krummes is in the employ of the School of Forestry in the Clearwater country.

Clive J. Lindsay, Hazelton, Idaho.

W. Faber Mershon is working with the R. C. Baruum Co., Wallowa, Oregon this summer.

Francis W. Minch and Howard J. Sargeant will be on a trail crew at Musselshell Ranger Station, Orofino, Idaho.

William Mitchell will be on timber survey with the School of Forestry in the Clearwater country. His address is Moscow, Idaho.

Arthur M. Norby, Rupert, Idaho.

Carl A. Remington, landscape gardening, Worcester, Mass.

Martin B. Rosell, Potlatch Lumber Co., Elk River, Idaho.

Wallace M. Saling, will also be riding "kyuses" this summer. He will be engaged on grazing reconnaissance on the Uinta National Forest, Springville, Utah.

Carl Shaw will be a lookout with W. H. Bolles on the Idaho National Forest, McCall, Idaho.

William S. Sheldon expects to spend the summer in travel.

Liter E. Spence. We feel for the horse "Liter" rides this summer on grazing reconnaissance, Martindale, Montana.

Earl E. Stahl, Rigby, Idaho.

Wilfred B. Stanley, Nezperce National Forest, Grangeville, Idaho.

Clarence E. Stowasser will try his hand at mill work. 525 W. Summit Ave., Coeur d'Alene, Idaho.

Cyprian D. N. Taylor will be engaged on survey work at Nelson, B. C.

Rex Wendle, fire patrolman, Northern Pacific Railroad Co., Sandpoint, Idaho.

Harry L. Whiting, will again be in blister rust reconnaissance. His address is 618 Realty Building, Spokane, Washington.

Marvin B. Wild, Ranger c/o A. E. Pauleys, Ione, Washington.

FORESTERS HOLD ANNUAL BANQUET

By A. B. HATCH, '28

The eleventh annual banquet of the Associated Foresters of the University of Idaho, held at the Blue Bucket Inn, March 17, proved to be the most successful and enjoyable in recent years. The speeches were unusually good, being spicy, short and full of interest. Dr. E. E. Hubert, who acted as toastmaster, introduced each speaker with appropriate remarks.

Dr. Upham was the first speaker of the evening and gave his "impressions" of the forest school and its students. He referred to the Associated Forester as being the most cosmopolitan group on the campus and expressed his opinion that the contact with these students from other states and countries, broadened the perspective of the Idaho students. The administrative policy is to heartily welcome these students from other states. In forestry, probably more than in any other profession, it is important that the student become acquainted with the problems incident to the work in all parts of the country. Hence, the great advantage of being able to associate himself with students from many different states. "I never fail", Dr. Upham remarked, "as I travel about the state to speak a good word for the School of Forestry."

Professor C. W. Chenoweth gave much good and humorous advice to prospective smoke chasers. His advice is based on many hair

raising, personal experiences in the Forest Service. He recommended that one take plenty of fishing tackle in going out for a summer of smoke chasing. He emphasized however, that a dress suit is not necessary to one's equipment. Fishing tackle seems to be the only equipment one needs for this kind of work. Other observations from personal experiences which Professor Chenoweth made ranged from mules to the electron theory.

The president of the Associated Foresters, Floyd Godden, was next introduced as a famous speaker. He gave an account of the principal activities of the Associated Foresters. It seems that the foresters originated the traditional wearing of camouflage on the upper lip. A logical explanation for this change in custom lies in the wild and unshaven life led by the timber beasts during the summer. Other traditions of the Associated Foresters are the annual all-college dance, the smoker, the farewell banquet for the seniors and the famous spring barbecue.

Mr. Harry Whittier, cashier of the Moscow State Bank, gave a talk on business ethics as related to forestry. Mr. Whittier told of the evolution of ethics in the last two centuries and showed that the ethical standards of today are far better than they were in the past. He established the fact that business ethics of today become laws of tomorrow. Two centuries ago churches were established by lottery, today lottery is not only unethical but unlawful. The successful business of today is based on sound ethics which in the great majority of instances is to the interest of the public. Today's ethical slogan is "the greatest good to the greatest number."

Rev. Roger P. Oliver gave a very inspiring address regarding America's need for foresters to restock the great areas of barren lands and to prevent the further devastation of the forests. Rev. Oliver emphasized the wonderful and unexcelled opportunity for service presented to the young man entering forestry. He cited as an example of one of his statements the remarkable straightness and tallness of certain trees subjected to wind, storm and many other adverse conditions. His message to all, which we will not soon forget was "when the outlook is bad, try the uplook."

H. T. Gisbourne, associate silviculturist Northern Rocky Mountain Forest Experiment Station, Missoula, Montana, forcibly reminded the foresters of the time and effort the forestry professors of Idaho are giving to educate the students. Idaho has become famous the country over for the excellence, finish and capability of its graduates. It stands second to no other forest school in the country and is held in high esteem by the Forest Service. Mr. Gisbourne further asserted that the type of finished technical foresters produced by this school, is due entirely to the faculty and the energy and conscientiousness with which they pursue their work.

Mr. A. D. Decker, connected with the Potlatch Lumber Company, was the next speaker. He very ably presented the lumbermen's side of the devastation problem. We heartily agree with Mr. Decker that the lumberman does not leave the forest devastated from his own choice. Economic conditions have been, and to a great extent, still are dictating the policy of the lumbermen. The lumbermen will continue to "cut clean and pull out" just as long as it is impossible from an economic standpoint to practice forestry. Lumbering is a business just as much as banking. The banker cannot carry on his business without a profit and neither can the lumberman. The foresters of the country however understand the conditions and are endeavoring in every way to aid the lumbermen in their problems.

Mr. S. V. Fullaway, Jr., assistant district forester in charge of forest products, Missoula, Montana, was the last speaker of the evening. The setbacks encountered by the student entering forestry were first recounted by Mr. Fullaway, who cited his own experience from the time he first entered forestry. Like many men new to the game and unaccustomed to the woods Mr. Fullaway went back to school after his first summer with the Forest Service in Colorado feeling that he never wanted to see the woods again. By the following spring however he had quite forgotten his misgivings of the previous fall and went back to the woods. That was nearly twenty years ago and Mr. Fullaway is still in the Forest Service.

Toastmaster Hubert finished the evening by introducing several distinguished guests and the Idaho graduates present. The guests were: Mr. Ludwig Swanson, in charge of the dry kiln operations of the Potlatch Lumber Co.; Mr. A. A. Segersten and Mr. H. S. Tussler, connected with the land office of the same company. The Idaho graduates were E. W. Renshaw and Adrian Nelson who are connected with the State forestry office in Moscow, and Harold Z. White of the Clearwater Timber, Company, Lewiston, and Mr. Howard W. Staples.

XI SIGMA PI

WILFRED F. BEALS

Xi Sigma Pi National Honorary Fraternity was organized as a local society at the University of Washington in 1908. The objects of the fraternity are to secure and maintain a high standard of scholarship in forest education, to work for the upbuilding of the profession of forestry and to promote fraternal relations among earnest workers engaged in forest activities.

A new constitution with a wider field was drawn up in 1915 and the fraternity became a national organization. Since 1915 eight other chapters have been installed at prominent forest schools throughout the United States. Epsilon Chapter of Xi Sigma Pi was established at the University of Idaho in 1920 with a membership of seven, two members of the faculty and five students. Each year has seen an increase in the membership of the fraternity and an increase in the activities. At present there are five faculty members and fourteen student members.

To be eligible for membership in Xi Sigma Pi, a student must have completed two and one-half years of standard college work in an approved school of forestry. Three-fourths of his grades shall have been above 80%, and he shall have received no failures in forestry subjects. He shall also have shown creditable interest and activity in practical forestry work. Scholastic standing in forestry is not the only aim of the fraternity, as it wants to stimulate and increase the activities and interest of the undergraduates in all matters dealing with forestry.

Soon after its establishment the Idaho chapter of Xi Sigma Pi inaugurated a movement to stimulate scholarship in forestry education. As a result, the chapter purchased an attractively designed bronze tablet, upon which are engraved each year the names of the students attaining the highest average in each class for the year. This tablet is placed on the walls of the main floor of the Administration Building, and the honor of having one's name upon it acts as a beacon throughout the four years.

Those students who have so far reached the goal are as follows:

1922—James W. Farrell, senior; Russell M. Parsons, junior; Arthur M. Sowder, sophomore; Paul M. Harlan, freshman.

1923—Albert S. Daniels, senior; Ralph S. Space, junior; Paul M. Harlan, sophomore; Floyd W. Godden, freshman.

1924—Rogers G. Wheaton, senior; Robert P. McLaughlin, junior; Floyd W. Godden, sophomore; Henry C. Hoffman, freshman.

1925—Ralph S. Space, senior; Warren H. Bolles, junior; Galen W. Pike, sophomore; William W. Mitchell, freshman.

1926—Warren H. Bolles, senior; Galen W. Pike, junior; Charles A. Connaughton, sophomore; George J. Illichevsky, freshman.

When prominent foresters visit the campus it has been the custom of the fraternity to have a luncheon followed by informal talks. This has not only served to get the men together in a social way, but they have always been given a message full of helpful pointers on matters of forestry.

The officers of Epsilon Chapter for the year just closing are:

Galen W. Pike, Forester, Mark M. Lehrbas, Associate Forester, Henry C. Hoffman, Secretary-Fiscal Agent, and Eugene V. Phelps, Ranger.

On April 12 the following new members were initiated: Arlie W. Toole, '27, Wm. W. Mitchell, '28, Chas. A. Connaughton, '28, Allan A. Cochran, '28, Liter F. Spence, '28.

SEEDING AND PLANTING TRIP

JACK SPACE

Each year the class in Seeding and Planting makes a trip into the northern part of the state, in order to acquire practical experience in planting. On this trip the boys get a chance to see some beautiful country that they probably couldn't get to see otherwise. Last year the trip was made to the Priest River Experiment Station near Priest River, Idaho. This year the class went to a government camp on the north side of Priest Lake about ten miles from Coolin.

The class left Moscow Wednesday, May 4,

some by auto and others by train. At Priest River the class was met by a government forest truck which took them to Coolin that night. Here they stayed over night. The following morning a small steam driven boat took the class up the lake to camp. The camp consisted of about 8 tents, one being an office, another the cook tent and the rest were sleeping tents.

Beginning Thursday noon the class planted trees for five days. The trees that were planted were western yellow pine, western white pine, and Englemann spruce. The latter two were planted only on the very best site. The stock was shipped in from the Savanac Nursery at Haugen, Montana. The yellow pine and white pine consisted of two year old transplants, and Engelman spruce five year old seedlings.

The class returned May 10, everyone feeling well repaid for the outlay of time in making the trip.

THE BETTER UTILIZATION OF WESTERN WHITE PINE MATCH STOCK

(Continued frrom Page 20)

hydrochloric acid, which burned the wood.

A similar experiment was run on the blue stain culture with no effect, because the threads were submerged in the agar culture medium. Hydrogen bisulphide gas was tried in the same manner, but it bleached the wood and not the threads of blue stain. With the apparatus used, there was no attempt to determine the volume of gas used.

No other bleachers were used as it would not be practical to have to wet the match stems while in the process of manufacture.

The conclusion that may be drawn from this experiment is that with a proper length of time and a proper concentration of dry chlorine gas, blue stained splints can be bleached on a commercial basis. As chlorine is a relatively cheap chemical and can be purchased in almost unlimited quantities. Practical tests are necessary, however, before any reliable conclusions can be drawn relative to the economic feasibility.

In the match industry the loss due to blue stain has not been accurately determined. Perhaps the reason for this is that cross grained heart pieces and knots all go into the waste bin with the blued pieces. But in order to determine whether it would pay to save the blued pieces, the amount wasted would first have to be determined.

The total waste in all branches of industry, due to blue stain, is estimated at ten million dollars. (6) So that if the match industry, which bears its proportion of the waste, could put all or a part of this on the profit side, it would make quite a difference in their balance sheet.

Conclusion

In conclusion, it might be said that there is room for more utilization of blued material. Some companies are working in blued stock, but others object to its appearance. The results tend to show that as the price of White Pine increases, the match companies will use blued stock as it appears or will bleach it. Bleaching blue stained wood is possible, as the experiment has shown. But if the blued stock can be worked in unbleached, a greater saving will be made. Their demand of research is to find something to take the place of the expensive White Pine. A separate blue grade cannot be created at this time, and more utilization cannot be had by shortening the length of the splint. The fact that some match companies are working in blued stock now indicates that perhaps the most logical result will be the working in of the blued material unbleached by all manufacturers in the near future.

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NEW EXTENSION FORESTER AND HIS JOB

By F. G. MILLER

One of the more recent developments for the advancement of forestry in the United States is the inauguration of extension forestry in various states, headed by extension foresters who function in the promotion of forestry in much the same way that agricultural extension specialists function in the promotion of agriculture.

The first efforts at organizing forest extension by the states were made by Michigan in 1911, followed by New York in 1912. Little progress was made by other states till after the close of the World War, but since then the idea has been taken up by the states one after the other in rather rapid succession till at the present time the majority of them have inaugurated definite forest extension policies, and more than thirty have appointed extension foresters.

The movement was given added impetus by the enactment of the Clarke-McNary Law in 1924. Section 5 of this act authorizes the United States secretary of agriculture to extend federal aid to the states in assisting "owners of farms in establishing, improving, and renewing woodlots, shelterbelts, windbreaks and other valuable forest growth, and in growing and renewing useful timber crops," provided that the amount expended by the federal government for this purpose shall not exceed the amount expended by any given state for the same purpose during any fiscal year.

Thru the cooperation of the United States department of agriculture and the extension division of the University of Idaho, under the terms of this act the office of extension forester to Idaho was recently created, and on April 16 Arthur M. Sowder was appointed to the position. Tho serving in the extension division the school of forestry will cooperate in outlining and directing his projects.

Mr. Sowder was graduated from the school of forestry, University of Idaho, in 1925, with the degree of Bachelor of Science in Forestry, and received the degree of Master of Science in Forestry in June of this year. While a student, he served for three years as secretary to the school of forestry, and in handling tree sales in that capacity, became well acquainted with the problem of tree planting in the state. He also has a practical knowledge of the native woodlot sections, hence by both training and experience is well qualified for this newly created post. For the remainder of this biennium he will act in the dual capacity of extension forester and research assistant in farm forestry under a cooperative arrangement between the agricultural experiment station and the school of forestry.

In this appointment Mr. Sowder becomes a part of the agricultural extension force of the University and will have the active cooperation of the various members of this strong organization in his work.

The field of work for an extension forester in Idaho is a large and an exceedingly important one and one that offers a rare opportunity for public service. The growing of timber is too often thought to be solely an obligation of the federal government and the state, but the Clarke-McNary Law recognizes the great need of private forestry, including its application to the farm, and this law seeks to encourage the farmer to include timber growing as a part of the program for diversified agriculture by placing at his command the services of an expert adviser.

Arthur M. Sowder
Extension Forester

Farm forest planting, so extensively practiced in other states, especially in those of the middle west, has not received the attention in Idaho that its importance deserves. A woodlot shelterbelt or windbreak on every

farm in Idaho should be the aim. At present, however, the larger portion of the farms in the treeless belts, bear little or no tree growth at all. That trees will succeed almost everywhere is attested by the fact that in practically all sections successful plantings are found. It is profitable to grow on the farm the fuelwood, posts, poles, and repair material required for home use. Besides such planting if properly placed will add comfort to the home, will prove ornamental, and will enhance the value of the farm property. Windbreaks should be very generally established. By checking soil erosion, reducing the evaporation of soil moisture, and breaking the mechanical force of windstorms they tend to increase crop production in many sections.

It will be the duty of the extension forester to advise the farmer in the choice of species to use, in methods of establishing various kinds of forest plantings, to impart information as to the care and management of farm woodlands, and to aid in the harvesting and selling of the forest products from them.

A small unknown acreage of farm forest plantings has been established in Idaho. These are found mainly in the irrigated belts. Records accurately made show many of them to be very valuable and give assurance that much more such planting would be profitable. Advantage will be taken of some of the more successful of existing woodlots and windbreaks in demonstrating their practicability as a part of the farming enterprise. Other demonstration woodlots, shelterbelts, and windbreaks will be established in various localities as object lessons to prospective planters.

One of the biggest jobs of the extension forester will be to bring about better management for the more than 800,000 acres of native woodlots, which the federal census credits to Idaho. These are found in the wooded belts of the state and consist of uncleared portions of the farms which are being developed from logged-off lands. While a certain per cent of these woodlots is agricultural in character and will eventually be cleared for tillage, yet a large portion of them occupies land too steep, too rocky, or otherwise off-color for farming and should be left permanently in forest.

As showing the value of these woodlot areas, it may be cited that the census schedules for 1920 called for the value in detail of woodlot products sold from or used on the farms in 1919. The items included firewood, fencing materials, logs, railroad ties, telegraph and telephone poles, materials for barrels, bark, or other forest products .

In Idaho, a total of 5,041 farms, or 12 per cent of the total number of farms in the state at that time, reported forest products sold from or used on the farms in Idaho in 1919, as having a value of $2,329,244, an average of $462 per farm. This is income which is largely net to the farmer, since the labor involved in harvesting and marketing is performed mostly in winter when he has the most spare time. It is income too, which with proper management may be greatly increased. In fact the increase in the decade from 1909 to 1919 was nearly 90 per cent. Just now a market is developing in the northern part of the state, for material suitable for paper pulp.

Thus it is that with upwards of 800,000 acres of forest land in the hands of the farmers, no small part of the responsibility for the proper handling of the forest resources falls directly upon them, a responsibility which they are accepting in increasing numbers since farm forestry is becoming more and more remunerative. Farm forestry is in short essential to the success of the forest policy of the state.

Fortunately there is an occasional example of a well managed native woodlot which the extension forester may use to demonstrate methods of bringing about better practices to make the native farm woods generally more profitable. He will also have the cooperation of the owners in placing other typical native woodlots under proper management to serve as demonstration woodland areas.

Windbreak Study

As research assistant in the agricultural experiment station, Mr. Sowder will undertake a study to determine the influence of windbreaks on the growth and yields of field and orchard crops grown under irrigation. The study will also stress the importance of establishing shelterbelts around the farm buildings for the protection of the family home and stock yards. In carrying out the project an extensive series of measurements will be made of the physical factors of crop production as influenced by the presence of windbreaks.

The investigation will also determine the species of trees best adapted to windbreak purposes, the arrangement of the trees to secure their best use, and the value of the products to be derived from the windbreak in order to determine the income from the land it occupies.

THE 1927 SPRING CRUISE

By H. I. NETTLETON

The annual spring cruise was held, May 6-11, on Flannigan Creek, seventeen miles northeast of Moscow. Ten men travelled by truck to the old camp site where the first half day was spent in establishing a comfortable camp for the week's work. The first event, upon arriving, was the selecting by lottery of the cook and his assistant. To Connaughton and Biker fell the strenuous task of building a camp stove and preparing the first meals, these duties being accompanied by considerable chaffing from their luckier teammates. An inspection trip to the lower Flannigan Creek area was made in the afternoon to study several species of wood rots and to discuss the best methods of handling them in the cruising work.

On the following day the men were divided into two control parties of four men each, for the purpose of retracing the boundaries of the section to be cruised and mapped. Elevation and strip controls were established by the double abney method, using topographic tape for distance and Forest Service staff compass for alignment. Elevation control tied in within four feet in four miles of line running, thus successfully completing the program for the second day.

On the third and successive days, the crew was divided into two man parties for the cruising and mapping of the area. The same instruments were used as in the control work, except that single abneys were used for strip running. A ten per cent cruise was made, running two strips per forty and using a twenty foot contour interval on a sixteen inch map scale.

In this work one man acted as compassman, head chainman and topographer while the second man acted as rear chain and abney man, taking slope shots and then cruising up to the topographer, after which both men moved forward for another one or two chain lengths, depending on conditions of visibility and topography. Types were mapped by the topographer and cruise sheets were changed at type changes by the cruiser. The cruising and mapping were completed in two and a half days, including time for re-running two of the eight strips. Due to heavy underbrush and dense reproduction, but one mile of line per crew per day was thought advisable.

In order to check the mapping of roads and contours, two two-man parties were dispatched the last day to run a compass, chain and double abney traverse over the logging roads which transected the section. These traverses were then plotted on the field map and served as an excellent check, both against the mapped location of the roads as crossed by the strip crews and the location of the contours as mapped by the topographers. The field map was completed in the field, adding and connecting each day's run of strips as completed.

By leaving one man in camp each day to act as watchman and cook and to work on the base map, the field workers had longer evenings in which to indulge in camp pastimes and swap stories over the evening campfire. Several members of the fair sex, chaperoned by the wife of the chief of party, descended upon the camp one evening and gave a decided variety to the usual evening entertainment, especially when all hands staged an old fashioned Virginia reel in the moonlight, to the tinkling accompaniment of mandolin and the crunching melody of calked boots on "lady-slippers." Light refreshments (marshmallows) were served between impromptu acts, conceived on the spur of the moment by the hosts and executed in fair order for the special benefit of the visitors. Rowe and Lansdon, Incorporated, "brought down the tents" with their Indian war dance. Thus, with daily duties and evening pleasures, the second annual spring trip came to a close and the boys returned to the classroom to compile the cruise data, which, incidentally checked within six and a half percent of the states' cruise, made two years previous.

The following men made the trip: John Baird, Carey Bennett, John Biker, Charles Connaughton, Gordon Ellis, William Lansdon, William Mitchell, Percy Rowe, Wellington Seymour and H. I. Nettleton, chief-of-party.

Associated Foresters Elect

At the last meeting of the year, May 31st, the Associated Foresters elected officers for the ensuing year as follows: Chas. A. Gregory, President; W. M. Saling, Vice-President; A. R. Cochran, Secretary-Treasurer; and M. B. Roselle, Publicity Agent.

PARTIAL CUTTING AND STIMULATED GROWTH IN WESTERN WHITE PINE

(Continued from Page 16)

data were available for the Clearwater region, and these were based on a few trees for only 13 years, whereas our predictions were to be made for 35 years. The only other material available was an excellent piece of work, but carried out in the Potlatch region of north Idaho—a region where growth conditions seem to be somewhat poorer than in the Clearwater country. This Potlatch study was carried on over a period of three years by H. I. Nettleton of the Idaho School of Forestry. A summary of the work is presented in table III. Nettleton's work shows the effect of stimulation for a period of 20 years. The table shows the mean annual growth during this time. It is assumed that the same rate of growth would continue up to the 35 year point. The stimulation in height growth is not shown here. It proved to have the same relation to diameter as the trees grown in a closed stand, so in figuring volumes the same numbers of logs for the different diameters were used as in the calculation of the volume of the original stand.

At the rate of growth shown in the table above even a one inch tree will grow up into the merchantable 7 inch class in 35 years. White pine easily shows the greatest response.

From table III the growth by diameter classes and species was projected for 35 years to form a stand table of the future stand. The volume production in this residual stand is shown in table IV.

It seems that 2139 board feet left in the residual stand now (Table II) assuming no loss incident to logging or from other causes will in 35 years produce 13,859 feet—an increase of about 500%. In the same way the residual white pine increases 700%—from 1382 feet to 10484 feet. The mean annual volume production for all species during the 35 year period is about 335 board feet per acre. For the white pine it is 260 board feet. The total cut in the residual stand will be 39% of the present cut in the original stand, and the future cut of white pine will be 45% of the present production.

Losses in the Residual Stand Due to Logging

Thus far in our calculations we have been dealing with what might be termed a potential residual stand, i. e. it contains all trees 11 inches in diameter and under as they occur in the stand before logging. It is certain that there will be considerable loss in this residual stand from breakage incidental to logging. At the time that these field studies which are the basis of the stand table were being made no logging had been done. Logging began in September, and in October came an opportunity to examine logged areas and see just how much timber was being left. The sawyers had been instructed to leave all trees under 12 inches in diameter, but it was a question as to how closely they were observing this limit, and it was even more important to determine the number of trees broken and knocked down by the felling.

Twenty-four acres of strip survey were run out in an area which had been studied during the summer. A comparison of the two sets of data—the potential residual stand and the actual—showed what percent of the potential stand was being left. These figures are contained in Table V.

Table IV
Volumes in the Residual Stand 35 Years After Logging
In Board Feet Per Average Acre

B. B. H.	Western White Pine	White Fir	Douglas Fir	Cedar	Larch	Lodgepole Pine	Spruce	Totals
7		120.4				2.6		123.0
8	186.0	97.6	18.6	38.6	1.0	0.6	2.0	344.4
9	329.5	145.8	31.6	28.4	0.7	4.2	3.6	543.8
10	272.0	160.8	39.0	52.0	2.2	4.8	10.4	541.2
11			95.2	48.5	37.8	10.4	18.4	210.3
12	800.8	304.0	64.8	93.6	7.6	16.8	5.2	1,292.8
13		178.4	106.0	164.0	12.3	21.0	17.0	498.7
14	1,005.1	259.0	120.0	146.0	15.6	23.0	24.2	1,446.9
15	1,086.8	428.0		178.0			27.0	1,541.8
16	1,822.4	484.0					28.2	2,334.6
17	2,480.0							2,480.0
18	2,502.0							2,502.0
Total	10,484.6	2,178.0	475.2	425.1	77.2	83.4	136.0	13,859.5

Table V

Showing Reduction in Numbers of Trees of the Potential Residual Stand by Breakage and Other Accidents Incidental to Logging. Expressed in Percent of the Potential Stand Remaining.

D. B. H.	Percent of Residual Stand Remaining
2	45
3	62
4	56
5	60
6	56
7	86
8	40
9	91
10	52
11	38

The figures for this table were not collected by the author, but by the senior class of the School of Forestry under the direction of Dean F. G. Miller.

The application of the figures in Table V to the potential residual stand gives us the volumes which we may expect at the end of 35 years under the present logging practice. These volumes are contained in table VI.

after logging?" The diameter limit discussed here has no scientific foundation that the author knows of. It is one temporarily chosen by the company—one which is conservative for them and which will show the feasibility of incorporating the partial cutting idea into their logging program. A comparison of other cutting limits and what they will produce is shown in Table VII.

Comparison of the three limits in the total column shows that a 12 inch limit leaves 1515 feet more in the residual stand at the time of logging than does the 11 inch limit, but 4422 feet more are produced at the end of 35 years. Comparing the 14 inch limit with the 11 inch, an excess of 4573 feet is left and 9297 feet more are produced in 35 years. Of course a diameter limit cannot be set up accurately until we know just what value in manufactured products is represented by the individuals of a certain diameter class. If the cutting is to be guided by a diameter limit in the woods, it would seem essential to have logging costs

Table VI

Board Foot Volume per Average Acre in Residual Stand at End of 35 Year Period with Allowances for Losses at the Time of Logging of the Original Stand

D. B. H.	Western White Pine	White Fir	Douglas Fir	Cedar	Larch	Lodgepole Pine	Spruce	Totals
7		54.3				1.2		55.5
8	83.8	60.5	10.0	17.4	0.5	0.3	0.9	173.4
9	240.0	81.6	18.3	16.7	0.4	2.4	2.2	361.6
10	163.0	96.5	21.8	31.2	1.2	4.1	6.2	324.0
11			60.0	27.1	23.8	4.2	10.3	125.4
12	448.0	170.2	59.0	80.5	6.9	15.3	4.5	784.4
13		153.4	55.2	108.2	6.4	10.9	6.8	340.9
14	862.0	103.7	45.6	76.0	5.9	8.7	22.1	1,124.0
15	435.0	308.3		67.7			14.1	825.1
16	1,660.0	184.0					10.7	1,854.7
17	1,290.0							1,290.0
18	953.0							953.0
Total	6,134.8	1,212.5	269.9	424.8	45.1	47.1	77.8	8,212.0

Unfortunately the larger diameter classes seem to sustain heavy losses in logging, and the total volumes of the whole stand and of the different species are reduced to about 60% of the volumes found in the potential residual stand. Probably the fallers have not observed the diameter limit very closely, and there can be little doubt that more care in felling the larger trees would save breakage and loss in the residual stand and measurably increase its yield.

Comparison of Diameter Limits

The selection of a diameter limit is a business proposition involving the question, "Does it pay better to cut a certain diameter class now, or to leave it for a period of growth

and the profits of the product also based on diameter classes.

Conclusion

Growth conditions for the white pine type are excellent in the region in which the Clearwater Timber Company is operating. An examination of their lands shows that a large part is covered with timber of the 80-100 year age class. Intensive studies covering 4 sections of this timber shows that the average acre contains a total volume of 37,603 board feet, taking the trees down to 7 inches d. b. h. If a diameter limit of 11 inches is adopted for cutting, the volume removed would amount to 35,464 feet. Allowing for losses in logging the original stand, in a period of 35 years the

residual material will produce a crop of about 8,212 board feet of which 75% is white pine. To test these conclusions a series of eight one acre sample plots have been laid out. These have been logged, and periodic measurements on them are expected to solve the problem of growth in residual stands in this particular region.

Table VII
Showing Comparison Between Three Diameter Limits, 11, 12, and 14 Inches
Expressed in board foot volumes per average acre in the residual stand at time of logging and again at the end of 35 years of growth after logging. Allowances made for losses during logging

	Western White Pine	White Fir	Douglas Fir	Cedar	Larch	Lodgepole Pine	Spruce	Total
11 inch limit								
Stand left	1,382.3	337.7	170.5	159.9	30.7	30.4	27.6	2.139.1
Final growth	6,134.8	1,212.5	269.9	424.8	45.1	47.1	77.8	8,212.0
12 inch limit								
Stand left	2,351.5	605.3	329.5	221.9	50.9	46.6	48.6	3,654.3
Final growth	8,219.0	2,741.2	651.1	775.2	111.2	41.1	95.3	12,634.1
14 inch limit								
Stand left	4,555.0	995.0	588.0	335.0	102.0	55.0	81.0	6,712.0
Final growth	11,989.0	3.383.0	910.0	930.0	116.0	49.0	132.0	17.509.0

FORESTRY ALONG THE NORTH AND SOUTH HIGHWAY

By C. W. WATSON

The writer recently had an opportunity to serve in a position unique to the forester. It was on the occasion of the annual congregation of 4-H Club boys and girls at the University of Idaho, at Moscow. These people, usually from 8 to 18 years of age, are members of local agricultural clubs—4-H Clubs. The clubs are sponsored by the agricultural organization, both national and state, and each June, 200 or 300 of the boys and girls with their adult leaders spend a week at the University, learning everything from how to raise a hog to the proper method of making a bed.

The visit entails a long trip for the contingent from the southern part of the state This year there were about 35 youngsters and leaders who formed a caravan of autos and trucks. Their route to Moscow lay over the famous North and South Highway, a fine surfaced highway traversing a country of tremendous canyons, great rivers, and large forests, a region significant in Idaho history and one of great geologic interest. To interpret the natural wonders to the party and to enable them to grasp the significance of their surroundings, two members of the University faculty, a geologist and a forester, were assigned to the party as technical chaperones. Dr. F. B. Laney officiated as geologist. The author illuminated the range management and forestry problems. Dr. Laney's intimate knowledge of the region, both geologically and historically, was of great value to the trip. He had, the previous year, made a road log of the route, and copies of this were distributed among the travelers, so that they could, with the aid of the speedometer, identify the various unusual features seen along the road.

We met the party at Starkey Hot Springs in the late afternoon of Thursday, June 9. Introductions were dispensed with quickly, and Laney and I talked a little about the trip ahead of us. They had already taken a swim in the warm pool at the inn, and curiosity led us up the quarter mile of trail to the hot spring. The party watched its sullen; steaming surface while I introduced the native vegetation of the region. For trees we were limited to yellow pine, Douglas fir, cottonwood, and willows, but shrubs and herbs were many and varied. Soon the questions began to flow from amateur botanists, and the conversation flitted hither and yonder throughout the plant kingdom and all of its sciences. My intellect escaped dessication by a fortunate incident—supper.

Supper is the proper word. There were no lunches on this trip. They were dinners, and then some. Breakfast began with a capital B, supper ended with a sigh, and an occasional

bump in the road was the only thing that spared our digestion.

After the evening meal, we drove to New Meadows through the beautiful yellow pines of the Weiser National Forest. In a park-like place there was a band of sheep bedding down for the night. The herder had pitched his tent a little distance away and was smoking a reflective pipe. Nature seemed in a slumbrous mood, so we all turned in with a short prayer for fine weather tomorrow.

Friday brought ham and eggs for breakfast and a fog for weather. It gradually cleared, however. As we left New Meadows we saw that it lay in a round level valley. Everywhere in the valley were hay and pasture lands, a great cattle country. Around the meadow was the forest. Eleven miles through the meadows brought us to the end of the valley. Here we stopped to discuss forestry in yellow pine, and Laney told how the region had been shaped by valley glaciation.

From Round Valley the Little Salmon River leaves to join the Salmon River, 24 miles below at Riggins. The highway follows the Little Salmon, a wild stream, foaming to the banks at this season. This ride, interrupted by a stop to see the falls, was the most beautiful part of the trip. The river falls fast, and its bed is so strewn with glacial boulders, that its course is a succession of rapids. Here we passed through a forest of yellow pine, Douglas fir, lowland white fir, larch, and Engelmann spruce, but 50 miles from Starkey we left the forest to see it only twice more in small patches near Grangeville and Winchester. The remainder of the route lay through the vast unforested grazing lands of the Salmon and Clearwater River Canyons and the great wheat lands of the high plateau.

Riggins, at the junction of the Little Salmon and the Salmon River, is in a mile-deep canyon. The Salmon is a powerful stream, rough and unnavigable. A few have gone down it in boats or on rafts, but many have lost their lives in attempting to do so. The Indians referred to it as The River of No Return, and they advised Lewis and Clark not to attempt its passage in their journey to the coast. Laney knows this country well, and he describes it. "A few miles west of Riggins on the highest peaks of the Seven Devils Mountains which reach an elevation of some 9,400 feet above sea level. This range, located between the marvelous canyons of the Snake and Salmon Rivers is exceedingly steep and rugged and presents some of the most magnificent mountain scenery of the world. Its rugged peaks and crags, its marvelous glaciated valleys, with numerous, indescribably beautiful alpine lakes, with the awe-inspiring Grand Canyon of the Snake River nearly 8,500 feet deep at its western base, affords mountain scenery of unsurpassable magnitude and grandeur."

Riggins is one of the best stopping places on the road. It was proved to us by a chicken dinner. From here the trip followed right along the Salmon River, 31 miles to Whitebird, where the highway leaves the Salmon to follow Whitebird Creek for a couple of miles. Then the traveler climbs out of the Salmon River canyon on the beautiful winding Whitebird grade, 12 miles of road constantly rising on a 4% grade to an elevation of 4,393 feet. The region of Whitebird was the scene of the first battle of the Nezpece Indian War. Here Chief Joseph ambushed the soldiers and defeated them.

The party arrived at Grangeville by late afternoon in a veritable cloudburst, but our spirits were not dampened, and we spent a gay evening. On Saturday we set forth for Moscow, passing through Winchester, Spaulding, and Lewiston. At Winchester the party visited the sawmill of the Craig Mountain Lumber Company. Many of the kiddies had not seen a mill before, and the head saws in particular, charmed them. Spaulding was the scene of the establishment of the first home, the first school, and the first church, west of the Rocky Mountains. Rev. Spaulding with his wife, in 1836, started the Presbyterian Mission here among the Indians on the Clearwater River.

From Spaulding to Lewiston our trail followed the route taken by the Lewis-Clark expedition down the Clearwater River in 1805. At Lewiston, there appeared the new power dam and the new buildings of the Clearwater Timber Company mill. The timber company had graciously invited us to examine their plant and it was a high point in our schedule. Unfortunately time would not permit.

At last we reached Moscow, after escorting the party over about 240 miles of fine roadway through a region which should make of Idaho a great recreational center. The geologist and the forester enjoyed the trip, and we found the party keenly receptive of our efforts. It was real education for these young people to see and understand nature where she is big and beautiful. What a story it will be to tell to those at home!

RANGE MANAGEMENT FIELD TRIP

By "AL" COCHRAN

Forestry students majoring in Range Management have in their Junior year a field trip of unusual value. This is the trip up the Snake River, on which the class collects forage specimens from the surrounding ranges. This is a unique journey, probably unlike any other in this country, certainly different from any taken by a forestry school class. The narrow canyon walls, the muddy swirling river, with its numerous rapids, and the straining, tugging little boat with its cargo of freight, sheepmen, and students make a picture not to be soon forgotten. The homeward stretch is the exciting part as the boat shoots the rapids like a great "shoot the chute" in the parks. The average speed is twenty to twenty five miles per hour on the down river stretch.

This year Mr. Watson was fortunate in being able to take the class to Summers Creek in Oregon which is about eighty miles up the river from Lewiston. A day was required for the trip. The next day, May 14, was spent in collecting range specimens. This is a bunch grass country and is now a large sheep range. The herbaceous plants were just beginning to bloom on the spring and fall range. Besides the large number of range specimens gathered, the class was able to make a liberal collection of the jingling appendages from the posterior end of some sort of a snake that is rather common to that region. Some of the brave lads attempted to collect specimens for the zoology department but were fortunate in their failure. The boat picked the class up about ten o'clock Sunday morning. They shot the rapids, climbed the Lewiston grade and arrived at Moscow in ample time to make the Monday morning eight o'clocks.

EARLY DAYS IN FORESTRY AT THE UNIVERSITY OF IDAHO

(Continued from page four)

ry an opportunity—a new field in which to render a real service, and that they worked faithfully and well at such courses as we were then able to offer, gaining a fair knowledge of those fundamentals from books, laboratory, and field, which enabled them to "make good."

Valuable Discipline in Early Field Trips

There is probably not a member of the early classes who does not yet recall some of the strenuous hikes which the field work of the early days made necessary. The students and faculty of the department today ride to field work in the college trucks and come home after a hard and profitable day at cruising or other work the same way, and it is far better thus to be, but when forestry at Idaho was first inaugurated the department had no trucks and the faculty and students had to ride the proverbial "Shanks' Mare". It meant earlier rising, long hikes up Moscow Mountain, wet and cold feet, and tired muscles. But Oh! such appetites! I can still see Decker and Favre and Hillman and Thornton ravenously making inroads on the Sour Dough pancakes, black coffee, "Ham and", etc.

Weak Ones Quickly Weeded Out

The early faculty had its own queer ways of getting rid of the fellow who thought forestry was all play in the woods, a mere summer's vacation on government pay. First the freshman year was "jammed full" of good stiff courses with "exams" to match. This of itself was no mild deterrent, but a six o'clock start to the top of Moscow Mountain in six to twenty inches of snow, a hard days climbing over logs and through the brush at cruising, or running lines with compass or chain up and down hill in two to three feet of snow, and then, a long hike home, in all, around twenty miles, was a test which changed the minds of more than one "snap hunter" as to what forestry was like. He was very apt to feel "Called to preach" or to switch to some course calling for less strenuous exercise and more of the cloistered quiet of the library. We had a few slogans evolved from various trips which had a good effect in "pepping up" the boys with the real "stuff" in them. A few examples follow:

"Remember, the other fellow is tired too."

"Keep smiling if your feet are wet."

"Don't be a baby."

"Don't grouch till after the camp fire is going, then you won't want to."

"Stay with Prof. if it takes the hide off."

A few field trips and a week spent in the logging camps when the snow was deepest,

winding up with a hike from Potlatch over Moscow Mountain with snow waist deep and down its south slope, reaching home after dark, was enough to settle the point as to whether a freshman was forestry material or not. If not, he knew it for sure by this time and no mistake about it.

The course was designed from the beginning to exact more than usual mental and physical effort. There was no attempt to spare either student or faculty. Everybody was energetic but tried his very best to be cheerful, helpful, and courageous. There was plenty of snap and go in all that was undertaken and everybody was made to understand that this was what would be expected of the student who accepted a position in forestry. The hardships which he met in taking his course were only a sample of what he was sure to encounter later, so met it bravely and as a part of the necessary preparation for the future. This was the general spirit of the early days of the forest school, and I am sure it also obtains in no less measure today.

In Conclusion

In this wandering attempt I have tried as best I could to give those who may care to have it a fleeting memory picture of those early years of the small and struggling course, now grown into the University of Idaho School of Forestry. We, like all pioneers, had our hardships and privations, and again like all good pioneers we had out joys and triumphs. We wasted little time in grieving over what we did not have. We were thankful for what we did have, and we made the most of it in every possible way. We soon found that there was much useful work to do and our rapidly growing circle of friends in the U. S. Forest Service and the lumber business gave us all we could ask—namely, a chance to "make good". We gladly took the chance and our record both past and present must be the answer.

If it may serve to encourage those now preparing in forestry to press forward, and may induce others to enter the great and even yet almost untouched field of forestry in Idaho, I shall be more than repaid for this effort.

To the old students who entered while I was in charge I send greetings, and wishes for your continued success. I have not forgotten a single one of you although I hear from only a few who can find time to snatch now and then a moment from their busy and useful lives to write me even a few lines. It is comforting and sustaining to know that you are laboring in Idaho and neighboring states and that without exception you are living up to the high expectations of myself and my able and faithful colleagues on the forestry faculty during the time we were at Idaho. I am interested in your future and in the present and future of our School of Forestry, its splendid and now imposing faculty, its much more numerous student body, although strangers to me, and in all that pertains to forestry in Idaho.

While my time is now largely taken up with the affairs of a large and rapidly growing business in which I am greatly interested, I shall never forget that one of the largest, most fundamental, important and permanent resources in Idaho is her millions of acres of virgin forests and her billions of feet of highly valuable timber, and I shall always be glad to lend a helping hand to forestry and foresters when the opportunity presents. The field is a noble one and the work worthy of the efforts of the best young men our state can produce.

RELATIVE MOISTURE CONTENT OF RIVER AND RAIL LOGS

By WILFRED F. BEALS, '27

Object of the Study

There has been a great deal of question as to the relative amount of water in logs brought to the mill by rail and those floated by stream. In this paper the term rail logs is taken to mean those logs brought to the mill by railroad, and river logs are those logs floated to the mill by stream or in booms across a lake.

Each year sees the virgin timber becoming more and more inaccessable. This means a longer freight haul, and today the problem of transportation is one of the lumberman's greatest problems. It is out of

the question to think of shipping lumber today without first drying it. The lumber can be piled and left to air dry, but this is expensive, since it takes several months, and the capital tied up is inactive. Checking and sapstain are more liable to take place in the air seasoning process, and this lowers the grade and value of the product. This seasoning can be carried on rapidly by means of dry kilns in which the lumber is brought to an air dry condition in a shorter time. The time varies with the species, size of board, moisture conditions, whether heart or sapwood, and with the amount of heat and humidity in the kiln. The operation of a kiln is quite an expense, so every hour the lumber remains in the kiln, the expense of production is increased. The greater the moisture conten,t the longer it will take to bring the lumber to an air dry condition. The object of this experiment is thus to determine the difference in moisture content between river and rail logs of western white pine (Pinus monticola), and if possible ascertain the relation of this variation in moisture content to the seasoning processes, also its effect on the lumber, such as shrinkage, checks, warps, cups, etc.

Apparatus

The kiln used is of the (miniature) fan blower type. It is heated by means of steam coils. One pipe is perforated and is used to furnish live steam in the early stages of drying, so that excess of checking and warping may be prevented. Circulation is obtained by means of an electric fan. One of the features of the kiln is a metal plate with holes evenly distributed over it. This plate is between the steam pipes and wood. The fan forces the hot air thru these holes, thus giving an even distribution of air. By this method the wood is evenly dried, while without the metal plate the hot air would rise to the top and the top boards dry out first. Cross pieces of seasoned Douglas fir were used, on which the pine boards were piled in the kiln. Calpiers and scales were the only other apparatus needed.

Material

The boards were cut from western white pine (Pinus monticola), approximately 1"x10" x24" in size. Thirty-five samples of river logged heartwood were run, and thirty-two samples of river logged sapwood. Only ten samples of rail logged sapwood and twelve of heartwood were run. This was because it was impossible to get any more samples of rail logged material. The weights of the boards were taken at the mill and then checked with weights taken on arrival at the laboratory.

The river logged material was transported by water and held in the mill pond for a period of seven months, while the rail logged material was dumped in the pond only a few days prior to cutting.

Method of Procedure

The material was shipped in paper lined wooden boxes so that as little loss of moisture could take place as possible. Immediately upon arriving in Moscow, the pieces were weighed to the closest one half gram, and thickness and widths were taken to the nearest one hundredth of a centimeter. The boards were next placed in the kiln and the steam turned on. The boards were piled so that there would be crossers between each two layers of boards. In laying the boards on the crossers, the ends were not allowed to extend over the edge of the crossers. In this manner the ends did not dry out too rapidly and end checking was diminished. The crossers were laid parallel to the direction of the air current so that complete circulation was obtained.

The temperature in the kiln was started at 185°F and gradually increased to 203°F. For the first hour the live steam was turned on so as to minimize the checking; and after seventeen hours the steam was again turned on, but for only one half hour. The boards were left in the kiln for a period of forty-eight hours, and then they were removed and carefully weighed. This was taken as the kiln dried condition. They were then replaced in the kiln and left until a constant weight was reached. The boards were then removed and a final weighing made, thus making it possible to determine the total moisture content of the lumber. After being taken out for the last weighing, the boards were again measured for thickness and width.. The measurements were taken at the exact point of the first measurements, thus eliminating any errors which might be due to inexact sawing. Shrinkage values were then determined. The moisture content remaining in

the wood at the end of the kiln run was also determined .

The kiln conditions of all runs were duplicated as nearly as possible, so that all data obtained would be as nearly on the same basis as could be obtained.

All percentages of moisture content were worked out on the basis of the oven dry weight. That is, the formula $\frac{W-D}{D} \times 100$ equals the moisture content, was used.

Where—

W equals wet weight.

D equals dry weight.

The shrinkage values were also worked out on the dimensions after drying, by the formula $\frac{W_1-D_1}{D_1} \times 100$.

Where—

W_1 equals wet dimensions.

D_1 equals dry dimensions.

TABLE No. 1

Shrinkage in Thickness for River Logs

No. of Samples			Average shrinkage in %
20	heartwood	end thickness	3.805%
20	"	edge "	4.762%
*15	"	edge "	4.280%
20	sapwood	end thickness	3.16 %
20	"	edge "	3,74 %
*12	"	edge "	4.42 %

* In this set of samples edge thickness measurements only were taken.

TABLE No. 2

Shrinkage in Thickness for Rail Logs

No. of Samples			Average shrinkage in %
15	heartwood	end thickness	4.770%
15	"	edge "	4.790%
10	sapwood	end thickness	3.69 %
10	"	edge "	3.51 %

TABLE No. 3

Shrinkage in Width for River Logs

No. of Samples		Average shrinkage in %
15	heartwood	5.91 %
20	"	5.29 %
12	sapwood	5.78 %
20	"	5.14 %

TABLE No. 4

Shrinkage in Width for Rail Logs

No. of Samples		Average shrinkage in %
15	heartwood	3.97 %
10	sapwood	5.35 %

TABLE No. 5
Moisture Content in River Logs

No. of Samples		Total moisture content	Moisture content kiln dried
15	heartwood	78.26 %	4.56 %
*20	"	72.43 %	——
12	sapwood	86.59 %	3.19 %
*20	"	117.29 %	——

* Weights were not taken at end of 48 hours. Oven dry weights only were recorded.

TABLE No. 6
Moisture Content in Rail Logs

No. of Samples		Total moisture content	Moisture content kiln dried
*10	heartwood	55.32 %	.326%
15	sapwood	45.86 %	.217%

* Higher moisture content in heartwood than sapwood due to water core.

Summary

Tables 5 and 6 show a comparison of the moisture content of the logs transported under the two conditions. The river driven logs showed much the greater percentage of moisture, as would be natural to suppose. After forty-eight hours in the kiln the river logs contained a much higher moisture content than the rail logs. It required fifty-four hours to bring the rail log samples to a constant weight. In the case of the river logs, one set required 54 hours, while the other required 72 hours to bring to oven dry conditions. These two samples were run under the same conditions. This shows how kiln runs may vary with samples which seem very much the same. These time studies do show, though that it will take longer to bring river logs to a constant weight under the conditions used in these tests.

In table 6 it will be noted that the heartwood had a greater moisture content than the sapwood. This was due to the fact that thirty-three percent of the heartwood samples of the rail logs showed water core. This is a type of defect quite common in the heartwood of the white pine. It is characterized by a darker color in the heartwood and is due to free water within the cells. Its relation to seasoning is being studied by Dr. E. E. Hubert of the University of Idaho School of Forestry. The water coring did not seem to affect the seasoning of the boards, except in the case of warping. The water cored boards did show excessive warping. The warping in all cases was away from the pith. That is, if a board is cut with the pith on one side of it, it will curve away from it. Or if a board is cut tangentially from a log it will warp away from the center. This checks with studies on warping by S. J. Record.

The temperatures and humidity in the runs were not the same as would be found in an ordinary large kiln run, though the boards came out in quite good condition, and not an undue amount of checking was found. Possibly the warping in the water cored boards might have been reduced by raising the humidity and causing slower and more even drying.

Some very interesting figures may be worked out from the average wet and dry weights of the boards. Table 7 shows the weights of lumber per thousand board feet under the different conditions. These figures show the great advantage of kiln drying the lumber before shipping. In the case of river sapwood the difference is more than sixteen hundred pounds per thousand board feet, or a reduction of 45% of weight. Rail sapwood showed a loss of over nine hundred pounds and a reduction of 32% of the net

weight. Rail heartwood showed a greater loss than the sapwood, but this was due, as explained before, to the presence of water core.

An article written by Mr. M. Bradner in the January, 1926 "Timberman" tells of the greater amount of blue stain found in river logs, and the loss in volume due to booming in the river logs. So aside from the greater moisture content in river logs there is a loss in grade and volume.

TABLE 7

Weight per M bd. ft, of Lumber

	Green wt. per M bd. ft.	Kiln wt. per M. bd. ft. Pounds	Diff. Pounds
River sapwood	3648.2	2023.7	1624.5
River heartwood	3290.8	1881.6	1429.2
Rail sapwood	2945.6	2027.0	918.6
Rail heartwood	3025.2	1879.4	1145.8

A. W. TOOLE, '27, APPOINTED DEPUTY STATE FORESTER

Mr. A. W. Toole of the Class of 1927 has accepted an appointment to the office of Deputy State Forester to the State of Idaho, succeeding E. W. Renshaw, who resigned to return to the U S. Forest Service.

A. W. Toole
Deputy State Forester

Mr. Toole is a native son of Idaho and has grown up in a forest environment. He, therefore, has a "woods sense" which makes him the valuable field man that he is. He was prepared for the University in the Lapwai High School, and entered here in September, 1922. He was self-supporting and so dropped out one full year in order to earn funds to put himself through. This year in the field, together with the summers spent there, enabled him to acquire much practical experience as a background for the position he now accepts. Mr. Toole passed the examination for the position of junior forester last spring and was offered a position in the Forest Service.

School Enjoys Visit from German Forester

Within the past year, the School of Forestry had the pleasure of entertaining Dr. J. A. von Monroy, a German forester of note, who stopped off in this region for several days in his tour of inspection around the world.

Dr. von Monroy spent some time with the School in its work on the holdings of the Clearwater Timber Company where he became greatly interested in the logging methods employed by this company. His special line of investigation was labor saving devices in logging, and he found conditions in the Clearwater region as to size of timber more nearly comparable to conditions where he was wanting to introduce American logging methods than in any other region he had visited.

von Monroy stated that the use of labor saving devices had become acute in Germany since the war.

HOW THE GRADUATES ARE EMPLOYED

The notes concerning the Alumni published in another part of this issue show the graduates of the School of Forestry to be engaged in a wide range of activities. It is of interest to note that of the sixty-five living graduates, eighty per cent, or fifty-two are engaged in some phase of forestry work.

Of these fifty-two, twenty-three are in the government service, three are in state work, two are connected with state forestry in India, two are on the faculties of universities, twenty are in the employ of private concerns, mostly lumber companies, and two are doing graduate work at Yale.

A further analysis shows the graduates to be widely scattered. Two, as mentioned, are in state forest service in India, two others will return to the forest service of the Phillipine Islands this fall, one is in the forestry department of North Carolina, and one is deputy state forester to Idaho. Assistant professor of forestry in the University of California is the title of one alumnus, and another holds the same title in the State College of Michigan. The California Fruit Growers Supply Company employs two of our graduates in prominent positions, one as logging superintendent and the other as forester to the company. Manager of the cedar pole department of a large lumber company indicates the important field one man occupies, and one is engaged as land agent by another prominent lumber company. Chemist to the eastern division of the Southern Pacific Railroad Company is the title of another, and one graduate is in charge of the dry kiln department of the Clearwater Timber Company. Another is field draftsman for the same company.

One graduate is a forest supervisor in the Forest Service, and three are deputy supervisors. Another is prominently identified with forest fire cooperation for the Forest Service in Montana and northern Idaho. Assistant range examiner, U. S. Biological Survey, Fairbanks, Alaska reads the title of another, and still another is extension forester to Idaho. One man is forest pathologist in the U. S. Department of Agriculture.

Of those not now engaged in the profession of forestry, one is an attorney at law and a prominent member of the Idaho legislature, one is a doctor of dentistry, one is a major in the U. S. Army, another is district engineer of the Pacific Telephone and Telegraph Company in California, and still another is a prominent realtor in Seattle. Others whose activities may not be specifically pointed out are engaged in useful labors.

Thus it is that the graduates of the School of Forestry are giving a splendid account of themselves and are reflecting great credit upon the School. All are still young men, and are really just well started on the road to achievement. The success of the School and that of the men it turns out are interdependent. Now that the body of alumni is increasing rapidly in numbers, so likewise the School is growing, both in service and influence.

ROSTER OF STUDENTS

The following is a list of students in actual attendance at the School of Forestry during the year 1926-27, with their home addresses:

Graduate Students

Nettleton, H. I., B. S. (For.) (1921 Oregon Agricultural College,) Moscow, Idaho.

Sowder, A. M., B. S. (For) (1921 Oregon Ag- of Idaho,) Coeur d'Alene, Idaho.

Seniors

Baird, John C., 2432 N. Rockwell St., Chicàgo, Ill.

Beals, Wilfred F., Okanogan, Washington.

Burroughs, Isaac C., 44 Kelsey Road, Poughkeepsie, N. Y.

Callender, William C., 1606 N. 12th St., Boise, Idaho.

Davis, Robert, 762 W. 3rd St., Riverside, Calif.

Godden, Floyd, River Falls, Wisconsin.

Greene, Edwin G., 218 So. Almond St., Moscow, Idaho.

Gustafson, Carl A., 610 W. 26 St., Vancouver, Washington.

Heggie, Tracy L., Montpelier, Idaho.

Hoffman, Henry C., 43 W. North St., Galesburg, Ill.

Johnston, Royal C., 11 Stuart St., Everett, Mass.

Lansdon, William H., 1502 N. 6th St., Boise, Idaho.

Lehrbas, Mark M., Box 304, Pocatello, Idaho.

Phelps, Eugene V., Carlinville, Illinois.

Pike, Galen W., East Woodstock, Connecticut.

Saling, Wallace M., Weippe, Idaho.

Space, Jackson, W., Orofino, Idaho.

Toole, Arlie W., Marshfield, Oregon.

Walrath, Fairly J., Orofino, Idaho.

Williams, Guy V., 704 McKinley St., Boise, Idaho.

Juniors

Bennett, Carey H., 579 24th St., Ogden, Utah.

Biker, John B., Nelson, B. C., Canada.

Cochran, Allan R., Sunbury, Ohio.

Connaughton, Chas. A., 1108 Jefferson St., Boise, Idaho.

Ellis, Francis Gordon, 4860 D. Street, Idaho Falls, Idaho.

Flack, Gordon L., 2017 W. Jackson, Spokane, Wash.

Gregory, Chas. A., 5812 N. Virginia Ave., Chicago, llinois.

Hatch, Alden Bruce, Y. W. C. A. Philadelphia, Pa.

Icarangal, Primo E., Pangil, Laguna, P. I.

Mitchell, William W., 1105 Madison St., Wilmington, Del.

Otter, Floyd L., 602 S. Adams St., Moscow, Idaho.

Rowe, Percy B., 113 N. Washington, St., Moscow, Idaho.

Seymour, Wellington, 111 McKinley Place, Monrovia, Calif.

Sheldon, William S., 86 Mariner St., Buffalo, New York.

Spence, Liter E., 307 Vine Ave., Park Ridge, Ill.

Williams, Floyd E., Rosalia, Washington.

Sophomores

Axtell, Donald H., 2604 W. Dalton, Spokane, Washington.

Balch, Prentice, E. 703 Wabash Ave., Spokane, Wash.

Bollinger, Roy E., 210 Broadway, Boise, Idaho.

Boyd, Buford K., 414 Jefferson, Moscow, Idaho.

Buckingham, Arthur, Gifford, Idaho.

Ficke, Herman, Payette, Idaho.

Fritchman, Holt, Naches, Washington.

Frost, Levi M., 619 So. Santa Fe St., Salina, Kansas.

Gries, George C., 3142 Diversey Ave., Chicago, Ill.

Hjort, George V., Kooskia, Idaho.

Hume, John Fred, Jr., Inland Hospital, Moscow, Idaho.

Illichevsky, George J., 609 Deakin Avenue, Moscow, Idaho.

Kayler, Dean C., Winchester, Idaho.

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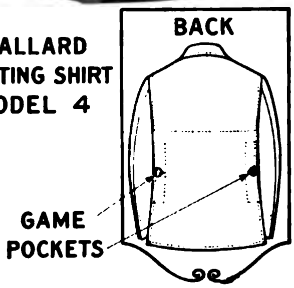

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Olson, Martin M., Rushford, Minn.

Parnell, Keith M., 507 Euclid Ave., Lynchburg, Va.

Roselle, Martin B., Elk River, Idaho.

Seeley, Theo. A., Moscow, Idaho.

Stanley, Wilfred B., E. 12 27th Ave., Spokane, Wash.

Stowasser, Clarence, 525 W. Summitt Ave., Coeur d'Alene, Idaho.

Sumsion, Alma B., Chester, Utah.

Wendle, Rex, Sandpoint, Idaho.

Freshmen

Adair, Sidney R., Potlatch, Idaho.

Anderson, Milton, Firth, Idaho.

Auger, Fred S., Winchester, Idaho.

Buchanan, Thomas S., Morton, Washington.

Burton, Cary L., Belle Plaine, Kansas.

Cherry, Howard C., 87 N. Stout, Blackfoot, Idaho.

Coleman, William W., Box 36, Cascade, Idaho.

Criser, Geo. A., Jr., Alabama City, Alabama.

Crosthwait, Lynn D., Maxwell, New Mexico.

Croy, John A., 1117 7th St., Clarkston, Wash.

Drysdale, Robert D., New Plymouth, Idaho.

Fisher, George M., 220 Main St., Ames, Iowa.

Forster, Norman B., Box 34, Orofino, Idaho.

Goodwin, Cardinal W., 1167 Monticella, Piedmont, Calif.

Halverson, Andrew G., Route No. 1, Kimberly, Idaho.

Hawker, Elmer A., 811 Sylvester St., Pasco, Washington.

Hockaday, James M., 1027 Deakin Avenue, Moscow, Idaho.

Jemison, George M., 2614 N. Stevens, Spokane, Washington.

Krummes, William T., 1316 E. Bannock, Boise, Idaho.

Langer, Charley J., 8035 S. Washington, Moscow, Idaho.

LeBarron, Russell K., 810 Rosser St., Bismark, N. D.

Mershon, W. Faber, 2221 Lynn, Williamsport, Pa.

Minch, Francis Watt, Colfax, Washington.

Nass, Herman Wm., Outlook, Washington.

Norby, Arthur Marvin, Rupert Idaho.

Remington, Carl A., 12 St. Elmo Road, Worcester, Mass

Riley, Arnold D., 1511 Prospect St., Lewiston, Idaho.

Sargeant, Howard J., Box 65, Granger, Washington.

Shaw, Carl Ingram, 916 Denver St., Caldwell, Idaho.

Stahl, Earle E., Rigby, Idaho.

Taylor, Cyprian D., R. R. 1, Nelson, B. C., Canada.

Whiting, Harry L., 2414 16th Ave., Spokane, Wash.

Wilde, Manin B., 514 So. Washington, Spokane, Wash.

Wood, Don George, Morton, Washington.

Rangers

Albright, Earl, 1292 Elm St., El Paso, Texas.

Cazier, Samuel Edwin, 309 Asbury St., Moscow, Idaho.

Daugherty, Charles, Weed, California.

Fowler, Richard A., Nakusp, B. C., Canada.

Hall, Nelson E., Sandpoint, Idaho.

Hawk, Lawrence W., 4102 Beloit Road, Milwaukee, Wis.

Neave, Edward W., Junction City, Oregon.

Robinson, George T., Proctor, B. C., Canada.

Scribner, John Perry, Chattaroy, Washington.

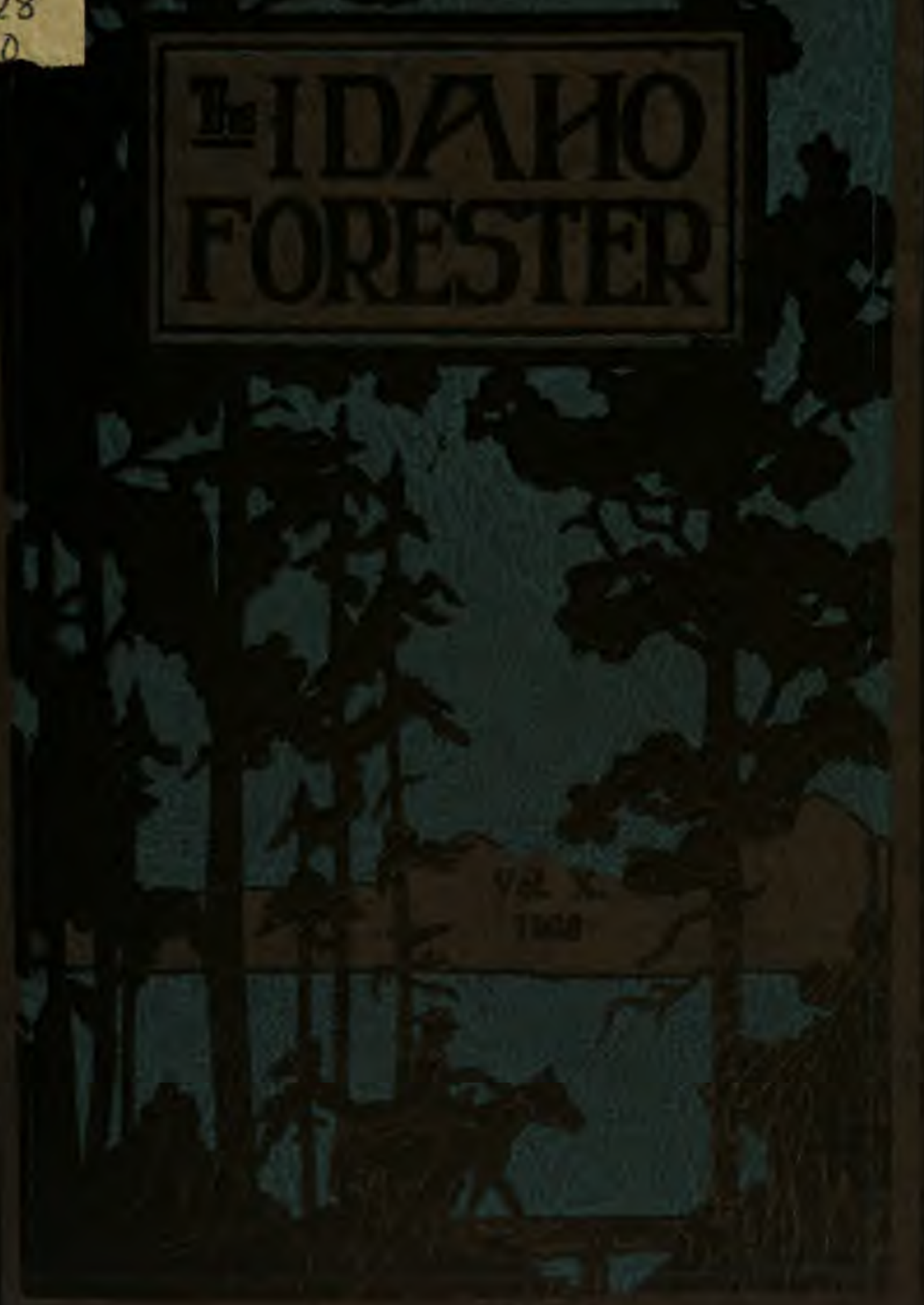
Stilwell, George G., Weiser, Idaho.

Tanner, Bahrd, Jackson, Wyoming.

Thurston, Chas. H., Jr., 875 Hoover, St., Roseburg, Oregon.

Wood, Bruce, Plains, Montana.

Adds a Car of Logs a Day!


The IDAHO
FORESTER

Illustrated Booklet
"TRACTOR LOGGING"

DEDICATION

In grateful recognition of his services to the cause of forestry, notably in the signing of the bill which gave the State a law generally recognized as a model of state forestry legislation, the 1928 edition of the Idaho Forester is respectfully dedicated to the

HONORABLE CHARLES C. MOORE

Formerly Governor of Idaho

A LAYMAN'S VIEWPOINT

By HON. C. C. MOORE
Ex-Governor of Idaho

There is very little that can be written regarding the forestry problems of Idaho with which the readers of the IDAHO FORESTER are not already familiar. Most of those who study the pages of this publication are devoting their time and their talents to the task of preserving for posterity a great national heritage. I need not cite impressive statistics for their information, nor quote the oft repeated shibboleths of conservation. Only those of us who are intimately acquainted with the timbered areas of this commonwealth, those of us who have traveled the forest trails and who are aware of the magnitude of the lumbering operations now being carried on, can appreciate the importance of the part being played by the men who make forestry a profession.

These men know there is no panacea that will prove an immediate cure for the many problems awaiting solution, particularly for the problems of fire control and reforestation. Legislation aided by definitely determined policies of continuing boards assists materially; but it is futile to hope for the complete solution of any problem by legislative enactment or the adopting of policies formulated by federal and state departments even though such policies be sanely planned and carefully executed. The economic factor is always the controlling factor.

The most promising indication of the new trend of thought is the fact that progressive lumbermen of the nation have come to consider timber land, not as a resource to be depleted and then abandoned, but as a perpetual asset to be worked as a perpetual operation. Already the results of this new economic policy are becoming apparent in the cutting of none but mature timber and the careful piling and burning of slashings and debris.

As I have said, the economic factor is the controlling factor. The importance of the lumber industry to Idaho compels the most serious attention to the commercial aspects of the situation. Nevertheless, in anticipating future conditions, we find developing another factor which requires consideration. The state owned and government owned forests belong primarily to the American people. Now, for the first time, the American people as a whole are awakening to a sense of personal ownership.

As a nation we have been prodigal with our natural resources; more so, perhaps, with the forests than with any other national asset. Now, for the first time in our history, we are beginning to look upon the timbered areas as summer playgrounds instead of mere sources of lumber supply. It is an indication of the changing national spirit that we are beginning to combine an appreciation of natural beauty with prosaic practicality. When Joyce Kilmer wrote the poem closing with this line, "But only God can make a tree," he gave us more than just a poem. He gave us a new understanding of the enduring qualities and inherent beauty of a living plant which, in an age of commercialism, we are prone to think of in terms of board feet.

With improved methods of transportation there has come, during the vacation months, an ever increasing movement from the cities to the forests. Already the more desirable locations are being utilized for permanent camping grounds. The time is not far distant when every glade and clearing will be the site of a summer home. When that time comes the people of our state and nation will appreciate fully the splendid work now being done by educational institutions, by the Forest Service and Forestry Boards and by forward-looking private enterprises.

OUR STATE FOREST LANDS

By BEN E. BUSH
State Forester of Idaho

The State of Idaho, next to the Federal Government, is the largest owner of forest land within its boundaries. The following tables from the "Idaho Forest and Timber Handbook" show ownership in detail. Table 1 shows acreage belonging to private, state, and federal agencies, Table 2 shows forested areas by counties, and Table 3 shows the ownership of "stumpage".

In the State of Idaho there are in the neighborhood of twenty million acres of land chiefly valuable for growing timber, the agricultural value being practically nil. The soil and climate are perfect for the growing of timber, and with proper management of this area the lumber and forest products industries may be made permanent.

For several years there has been a growing

TABLE 1—[1]Classification and Ownership of Idaho Timberland—Thousand Acres

Ownership	Total Area Within [2]Forest Belt		Forest Land			Other Land
				Noncommercial Timber Area		
	Thousand Acres	%	Area Supporting Timber of Commercial Size	Young Growth Including Cut-over, and Burned Lands	[3]Protection Forest and [4]Scrub Growth	[5]Agricultural Grazing and Barren Areas Within Forest Belt
North of Salmon River						
Private	3,683	34.0	1,424	1,496	308	455
[7]State of Idaho	668	6.2	389	206	64	9
National Forest	6,208	57.4	2,179	2,830	908	[6]291
[8]Other Federal	255	2.4	68	151	22	14
Total North of Salmon River — 1000 Acres	10.814	100.0	4,060	4,683	1,302	769
Total North of Salmon River — %	42.0	....	42.4	66.5	39.8	13.1
South of Salmon River						
Private	638	4.3	239	100	33	266
State of Idaho	322	2.2	114	47	36	125
National Forest	12,765	85.4	4,988	2,104	1,566	[6]4,107
[8]Other Federal	1,215	8.1	182	107	330	596
Total South of Salmon River — 1000 Acres	14,940	100.0	5,523	2,358	1,965	5,094
Total South of Salmon River — %	58.0	....	57.6	33.5	60.2	86.9
Entire State						
Private	4,321	16.8	1,663	1,596	341	721
State of Idaho	990	3.8	503	253	100	134
National Forest	18,973	73.7	7,167	4,934	2,474	[6]4,398
[8]Other Federal	1,470	5.7	250	258	352	610
State Total	25,754	100.0	9,583	7,041	3,267	5,863

NOTES:

1. All figures rounded off to nearest 1000 acres.
2. This embraces the general timbered regions of the State, excluding agricultural or grazing areas within such region.
3. Areas of timber which because of size and accessibility are chiefly valuable for watershed protection.
4. Areas of scattered poor quality timber generally outside of thd true forest type—along steep river breaks in parts of the State.
5. Areas actually cultivated or cleared for agricultural purposes.
6. This acreage includes only barren mountain and grass lands.
7. Includes Heyburn State Park.
8. Includes Public Domain, Indina Reservations, unpatented mining claims, coal and waterpower withdrawals.

FOREST RESOURCES

Table 2—[1]Classification of Idaho Timberland by Counties—Thousand Acres

COUNTY		Total area Within [2]Forest Belt	Forest Land: Area Supporting Timber of Commercial Size	Forest Land: Area of Noncommercial Timber: Young Growth Including Cut-over and Burned Lands	Forest Land: Area of Noncommercial Timber: [3]Protection [4]Forest and Scrub Growth	Other Land: Agricultural Grazing and Barren Areas Within Forest Belt
Northern Group						
Boundary		759	271	275	158	55
Bonner		1,121	359	548	91	123
Kootenai		637	170	396	29	42
Shoshone		1,623	487	925	160	51
Benewah		428	176	223	5	24
Latah		493	187	192	22	92
Clearwater		1,530	763	541	165	61
Idaho (North)		3,970	1,571	1,513	600	286
Nez Perce		130	33	38	41	18
Lewis		123	43	32	31	17
Total North of	1000 Acres	10,814	4,060	4,683	1,302	769
Salmon River	%	100.0	37.6	43.3	12.0	7.1
Southern Group						
Ada		3	....	2	....	
Adams		554	315	60	34	145
Bannock		289	44	55	7	183
Bear Lake		232	40	60	6	126
Blaine		539	150	33	19	337
Boise		1,092	517	136	192	247
Bonneville		471	107	150	13	201
Butte		245	45	15	39	146
Camas		338	97	17	18	206
Caribou		311	55	106	3	147
Cassia		554	15	106	70	363
Clark		374	102	70	29	173
Custer		2,068	774	186	474	634
Elmore		722	196	43	216	267
Fremont		573	164	160	33	216
Franklin		97	16	19	4	58
Gem		173	39	6	7	121
Idaho (South)		901	519	229	91	62
Lemhi		2,496	854	427	376	839
Madison		49	13	17	2	17
Oneida		88	13	18	3	54
Power		233	13	16	....	204
Teton		105	30	31	5	39
Twin Falls		93	26	3	....	64
Valley		2,189	1,300	378	308	203
Washington		151	79	15	16	41
Total South of	1000 Acres	14,940	5,523	2,356	1,965	5,094
Salmon River	%	100.0	37.0	15.8	13.1	34.1
Entire State						
State Total	1000 Acres	25,754	9,583	7,041	3,267	5,863
	%	100.0	37.2	27.3	12.7	22.8

NOTES:

1. All figures rounded off to nearest 1000 acres.
2. This embraces the general timbered regions of the State, excluding the larger agricultural or grazing areas within such regions.
3. Areas of timber which because of size and accessibility are chiefly valuable as watershed protection.
4. Areas of scattered poor quality timber generally outside of the true forest type.

insistence on the part of the citizens of Idaho that the timber of the State be given adequate and efficient protection from fire and that waste in the course of utilization be greatly reduced, if not entirely eliminated. Most people in Idaho seem to feel that our beautiful mountains and valleys must be kept green, instead of being left devastated wastes and a constant menace to life and property. They now recognize the importance of our forests in connection with the protection of water sheds for irrigation, power, scenic beauty, recreation and range. It has also dawned on them that under proper management, regulation of cutting and fire protection, the lumber industry, with its annual local payroll of $22,000,000.00 may be perpetuated for many years, if not indefinitely, instead of cutting out and leaving abandoned communities, loss and utter desolation in its wake.

As a result of this newly awakened "conservation conscientiousness" of our people, the Idaho Legislature in 1925 passed a new forestry law, which, while meeting with some opposition from certain lumbermen and owners of cut-over lands, has been very generally conceded to be one of the best, most efficient and most progressive statutes of the kind ever passed by any state.

Under the provisions of this law it is not only possible but altogether probable that our forests, as well as our forest industries, will be perpetuated for all time and that irrigation, power development, recreation and the livestock industry will thrive and increase and Idaho will continue to be a sportsman's paradise and a most delightful place in which to live.

When methods have been developed for utilizing what is now wasted in our woods and

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Table 3—[1]The Timber Resources of Idaho—Million Feet B. M.

Ownership		Kind of Timber				Total All Species	
		Idaho White Pine	[3]Western Yellow Pine	[4]Larch and Douglas Fir	[5]Other Species	Million Feet B. M.	%
North of Salmon River							
Private		7,246	3,086	6,563	5,699	22,594	44.0
[6]State of Idaho		2,255	411	1,687	1,907	6,260	12.2
National Forest		3,868	1,909	5,953	9,995	21,725	42.3
[7]Other Federal		165	149	245	214	773	1.5
Total North of Salmon River	Million Feet B.M.	13,534	5,555	14,448	17,815	51,352	100
	%	100.0	33.6	62.7	63.1	63.2	
South of Salmon River							
Private			1,633	279	164	2,076	6.9
State of Idaho			593	210	112	915	3.0
National Forest			8,067	7,779	9,666	25,512	85.2
[7]Other Federal			691	311	453	1,455	4.9
Total South of Salmon River	Million Feet B.M.		10,984	8,579	10,395	29,958	100.0
	%		66.4	37.3	36.9	36.8	
Entire State							
Private		7,246	4,719	6,842	5,863	24,670	30.2
[6]State of Idaho		2,255	1,004	1,897	2,019	7,175	8.8
National Forest		3,868	9,976	13,732	19,661	47,237	58.1
[7]Other Federal		165	840	556	667	2,228	2.8
State Total		13,534	16,539	23,027	28,210	81,310	100.0

NOTES:

1. All figures rounded off to nearest million feet B. M. No estimate is shown for areas of scrub-timber growth.
2. Pinus monticola (Western white pine).
3. Pinus ponderosa (Pondosa pine).
4. Larix occidentalis and Pseudotsuga taxifolia (western larch and Douglas fir—sold commercially as larch-fir).
5. Includes lodgepole pine, white and alpine fir, Engelmann spruce, cedar, hemlock, white bark pine, etc., in order of importance about as named.
6. Includes Heyburn State Park.
7. Includes Public Domain, Indian Reservations, unpatented mining claims, coal and water-power withdrawa ls.

UTILIZATION OF WOOD WASTE—THE NEED

By W. D. HUMISTON
Potlatch, Idaho

The lumber industry of the Inland Empire and Intermountain Region is in a very bad condition. The trouble is chronic inanition—exhaustion from lack of nourishment.

With all the potentialities and possibilities of a wide market that might be enjoyed in supplying our rightful share of the needs of the 120 million people now within the boundaries of our own country; with a certain amount of export business to take some of the keen edge of competition of Coast and Southern mills; and with the largest and longest building boom our country has ever seen, our plants are limping along with curtailed operations, losing a lot of money on nearly all mixed lumber produced, barely breaking even on their yellow or Pondosa pine production, and not making enough money on their white pine to absorb the losses incurred in turning out the mixed lumber. If any of our Idaho lumbermen made any worth-while net profits in 1927, I haven't heard of them. Practically all of them are literally giving away their reserves of stumpage which were, for the most part, purchased many years ago and on which they have been paying protection charges and rapidly increasing taxes ever since.

Why do these conditions obtain?

The answer is almost too obvious.

By clever advertising on a large scale; by aggressive, intelligent salesmanship; by retaining in their own control the channels of distribution of their products, thus controlling the price to the ultimate consumer; and by convincingly emphasizing the utility value of their products; the manufacturers of substitutes for lumber have been able to and have raided and usurped the markets which the lumbermen formerly enjoyed. They have been able to do this in many instances through the research work and co-operation of industrial chemists which they were keen enough to see the value of and on which they based their plans.

We hear a great deal these days from the lumberman about over-production and the standard prescription recommended for the industry seems to be "CURTAILMENT OF OPERATIONS". For many years until comparatively recently the consumption of lumber in the United States was fairly uniform at around 600 feet per capita per annum. The estimated consumption of lumber in 1927 was 35 billion feet, or about 292 feet per capita—less than half what it used to be before our people were educated by our competitors to use almost anything and everything in preference to lumber. Of course, there is no gainsaying the fact that, for certain purposes, steel, concrete, brick, terra cotta and other substitutes are superior to lumber, and it would be unwise to advocate the use of lumber where some other material would clearly and unquestionably be better. But, it is equally true that there are so many places where substitutes are now being used where lumber would be much better—or just as good—that we are losing a lot of business that should rightfully be ours. It may not be reasonable to expect or contend that we should still be able to easily produce and market 600 feet of lumber per capita per annum, but, if we could, our output last year would have been 72 billion feet, instead of 35 billion feet. But, if we grant that the substitute manufactures are rightfully entitled to some of the business formerly enjoyed by the lumbermen, it still seems fair to assume that an annual consumption of 400 feet per capita would not be far from what could be claimed as the lumbermen's legitimate share of the business. On this basis the lumber consumption of the country would have been 48 billion feet in 1927, instead of 35 billion feet. The difference of 13 billion feet is just the difference between economical and profitable operations and the curtailed, unprofitable operations which make such a steady demand for red ink around the end of the year.

The condition of the industry within the Inland Empire or the Intermountain Region is even more acute and distressing than that prevailing over the country as a whole. Light stands of timber; a mountainous country; high logging costs; long log hauls; eight or ten species of timber, only two of which are greatly superior to those of more favored and accessible sections; high wages; short hours; and the lack of an export business which will absorb a surplus; these are some of the special handicaps which make our local problem doubly difficult.

Under all these conditions and with a full knowledge of them and of their inevitable con-

sequences, we have allowed the lumber substitute manufacturers to invade our markets and take the best of the business from us "like taking candy away from a child."

I don't know how much or whether any part of this business can be won back by the industry. Possibly our only recourse now is to increase our sales of lumber, as such, by developing new forms of or uses for it. Certainly overproduction is not the crime for which we should be indicted. Ours have been sins of omission—not doing enough modern, effective advertising; lack of aggressive salesmanship; ignorance or disregard of economic laws; need of modern merchandising methods; and deficiency of industrial and chemical research. Our successful substitute competitors have effectively used all of the business aids and weapons we have passed up.

But all is not lost. We still own immense reserves of raw material, rich in possibilities of profits. If we can't make as many boards as we would like to and sell them at a profit, perhaps we can make something else out of this raw material. If we find that we can ultimately win back our markets and run our sawmills to capacity, we have still another source of possible profits which we have ignored heretofore, namely, woods and mill waste, which can be turned into by-products and innumerable chemical derivatives. At present only 35% of our standing tree goes into lumber and 65% is pretty largely wasted.

Probably not one lumberman in a hundred remembers enough of the chemistry he learned in school to be qualified to arrive at a sound conclusion as to what products should be made, what processes should be used and what the operating costs and net profits are likely to be as a result of launching a program of manufacturing by-products and chemical derivatives from low-grade material and from what is now largely wasted in the woods and plant.

This is a difficult and complex scientific problem. In fact, many problems are involved in connection with each and every product to be considered. To solve these problems correctly, we must have the assistance and co-operation of industrial chemists, research engineers, cost accountants, market analysts and, ultimately, of advertising experts.

We know now that there are many products and derivatives which can be made from such raw material and waste as we have and produce in the Inland Empire. Probably no forested region in the country of equal area has as many possibilities. Our eight or ten timber species widen our field immeasurably and give us an enormous advantage over other regions. But we also know that not all possible products and derivatives from eight or ten species of timber are likely to be profitable or commercially feasible; and, if they were, that some would certainly be more profitable, or command a wider market, or offer more attractive future possibilities than others.

What the lumber industry needs most at this time is a Moses to lead it out of the wilderness of waste, inefficiency and staggering losses. It needs some authority, in which it has confidence, to say that all indications point to the probability of the commercial feasiblity of manufacturing some few specific products and to support this statement with a simple, non-technical exposition of methods, processes, present prices and such other data as are available.

This, it would seem, is the duty of—as well as the greatest opportunity ever offered to the forestry schools of our state universities and to our state and Federal forest experiment stations.

In conclusion, I want to sound a note of warning. By reason of the nature of your work, you scientists and technicians move very carefully and consume a great deal of valuable time in checking, cross-checking and re-checking your work, conclusions, findings and recommendations. Then it takes you a long time after a study is completed to get out a preliminary draft of a report. This is checked, edited, rewritten, re-edited, cussed and discussed ad infinitum before the final report is turned loose. This may be the one and only way to handle scientific or highly technical problems, but, as in the case under discussion, those who should be the beneficiaries of your work may have died or gone to the poor house while you are doing all this.

If you, the chemists, technicians and foresters of the Intermountain Region, decide to come to the rescue of the lumber industry at a time when it sorely needs your assistance and co-operation, I earnestly urge that you do so quickly; that you prosecute your work as rapidly as possible and as **reasonable** accuracy warrants; and that, as often as may be, you issue progress reports for the purpose of sustaining the hope and bolstering up the courage and determination of your patient to fight and

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SUGGESTIONS FOR FOREST RESEARCH IN IDAHO

By J. A. LARSEN
Formerly Director, Northern Rocky Mountain Forest Experiment Station

In this article an effort will be made to answer two seemingly simple questions: First—What is forest research? Secondly—What steps should be taken to further forest research in Idaho? The first of these will be dealt with very briefly, the answer to the second will occupy the greater part of this paper.

Forest research follows three distinct but parallel lines; that of forest production, that of forest utilization, and that of forest economics. In the first of these classes are studies leading to the discovery of suitable conditions for restocking of the forest after logging or fire, the factors affecting success or failure in planting of forest trees, the rate of growth, yield, and the perfection of protection from insects, fire and fungi, etc.

In the second class, that of utilization, forest research is aimed at the identification and evaluation of various trees in the industries. There are problems of logging, manufacture, seasoning and marketing. New uses must be developed for poor sellers — and Idaho has many such—There are questions of wood preservation from fungous and insect injuries, the elimination of waste and many other useful and profitable avenues for research.

Lastly, in the third class are problems in forest economics—taxation, land and crop valuation, forestry land values compared to agricultural values, regulation of the cut to provide a steady income or to fit actual growth to industrial demands.

The second question—What steps should be taken to encourage forest research in Idaho, may not be so easily answered. At the present time however, not a few forest problems rather peculiar to Idaho are clearly defined. These will be discussed later in this paper.

Idaho is a timber exporting state; Idaho has vast areas of mountainous land which are exclusively suited for the production of forest crops; the Idaho climate and soil are eminently suited for the production of wood in large quantities. Lumbering is Idaho's chief industry; in this business the annual payroll is $22,000,000.00; the income from the state and government timber combined equals $200,000.00 per year and the taxes accruing from all privately owned timber holdings amount to $1,500,000.00 per annum.

However, over and above these industrial and monetary values, the Idaho forests supply game, fish and recreation grounds, steady flow of pure water over spillways and through irrigation ditches, and transportation for logs and water to the stamping mills. But Idaho's timber wealth is rapidly yielding to the axe and fire. Hitherto much thought and scientific research have been devoted to development of agriculture in the state. Is it not equally important to give some consideration to the forests? In order to reap from the forests perpetually and to insure the permanency of industries dependent thereon we must have more intimate knowledge of the forest. The only way to acquire this knowledge is through forest research.

Research in forestry to be productive of the best results must have proper organization and direction, adequate support, competent personnel and facilities for study.

Proper direction is of great importance. It is the solemn duty of those who direct that they lead forest investigators along the most useful, the most urgent, and the most productive channels; that they supervise the accumulation and dissemination of the knowledge obtained, avoid needless duplication and provide funds and facilities for study.

The mainspring and the "governor" of the works should be a non-salaried board composed of men from the various industries and activities throughout the state. This board might well be composed of the State Land Commissioner, the director of the state experiment station, the dean of the school of forestry, representatives from the departments of botany, zoology, agronomy and soils of the state university; a stock owner, a lumber manufacturer and timber owner, an influential banker, an orchard man and the state forester.

This board could meet once each year to review progress made in research, to suggest or approve new studies or such as are most urgently needed, recommend appointments, appropriations and salary increases, etc. It would also be desirable to have this board

make contacts and secure co-operations and support for research throughout the state.

This board should likewise indicate what should be the acceptable standards in forest research, and the standards of personnel, training and experience needed for the carrying on of this important work. It might also be of great service in pointing out what legislation would be desirable in the furtherance of forest research in the state.

There is no gainsaying the fact that much valuable information may be gathered through the co-operation of university professors who desire to pursue research. This co-operation could easily be extended to several lumber companies, timber owners, mine owners, stockmen and farmers. In this way the Idaho forest research program would ramify to every cranny of the state and all studies which bear on the forest crop directly or indirectly would have the attention and assistance of specialists in their several lines such as soil, ecology, game, agronomy, etc.

This co-operation would naturally extend to the U. S. Forest Service, to the Madison Forest Products Laboratory and to the more centralized and richly endowed research institutes in the country.

Idaho foresters might well strive to bring scientific forestry into research organizations on the university campus, especially into Sigma Xi meetings. As the field develops there will be abundant material for many interesting discoveries and discussions. Graduate students particularly in the natural science departments, should be encouraged to major in studies which touch on forestry, forest products or forest relations. A general quickening of interest among the scientific men of the state, and their active support in this field will surely be productive of many valuable results.

One of the very finest things for forestry that could come about in Idaho would be the organization of a permanent Forest and Conservation Association. Something of the kind is needed to bring people together who are concerned about Idaho's natural wealth. The American Forestry Association and the Society of American Foresters will never be able to fill this need in this state. Such an association will provide a means for rounding up the best and most practical ideas and crystalize these into definite resolutions which would carry weight in the moulding of popular sentiment and in bringing about favorable legislation. It must be said of a truth that in respect to such organizations the West in general and Idaho in particular lags far behind central and eastern states.

It is highly recommended that the state set aside representative areas for the study of forest and grazing problems. In any line of field investigation the installation of permanent plots and repeated observation and records become indispensible.

It would be preferable that such areas belong to the state and be adequately protected from stock and fire. One of these research areas would be the Idaho School Forest. These sample areas would carry experiments many of which will eventually become demonstration areas in methods of cutting, natural reproduction, planting, slash disposal, fire protection, and grazing management.

Obviously the possibilities for experiments are too numerous to mention here. Some of these investigations would parallel those conducted by the federal research bureau, but in this there is no harm, inasmuch as the policy and practice of the latter will not in every respect coincide with those of the state nor with those of private owners.

Scientific conduct of research hinges upon several factors and conditions. Perhaps more than anything else upon the individual investigator himself—his education, training and personality. He should have a thorough grounding in the physical and natural sciences, training in scientific methods, outstanding mental capacity and ability to form accurate judgment. He must have patience, perseverance and a high regard for professional ethics and the opinions of his contemporaries in the same field.

The investigator must have freedom of action to go and come from and to the field as he shall see fit, to visit conventions and take part in meetings in or out of the state where forestry or allied problems are discussed. He must keep abreast of all new ideas and developments in the state in this country and abroad, and he should be encouraged to visit other forest experiment stations and attend national conventions.

When it comes to the problems to be studied it is only possible to hit the high spots. The policy would naturally be to further the development of industries and to encourage new industries for unusual or little used native raw material. New uses should be discovered for hemlock and grand fir. There are possibilities in the line of box and crate material,

excelsior, tannin products, balsam wool, pulp, paper and ethyl alcohol, etc. It is a great pity that these splendid trees which nature has produced should be a drag on the market and be logged at a loss. Much of the land laid waste in logging by private companies should be reforested. This land will never be used for agriculture. Rather than allow it to lie unproductive and become a burden, the st..3 should lead the way toward a speedy reforestation. Besides there must be a new crop to fill the gap after the virgin stands have disappeared. But the planting methods now in use are too slow and too expensive to warrant extensive reforestation. There is here a field for the development of stock and methods which will materially reduce the cost per acre and increase the survival. Michigan plants for $3.00 to $4.00 per acre. The planting problems are peculiar to Idaho logged-over and burned-over white pine lands and the methods must be worked out here and here only.

Another promising line of investigations would be aimed at extension of the white and yellow pine forests in Idaho inasmuch as these species produce the bulk of the export lumber and bring very good prices. This would mean a very close study of the soil and climate requirements of these species and experimental plantings wherever it is considered probable that white pine or yellow pine will grow to timber size. It might be found upon trial that Norway spruce or silver fir would produce a more valuable timber crop than either larch, Douglas fir or lodgepole pine.

There is, no doubt, need for a thorough investigation and classification of species most desirable for mine timber in various parts of Idaho.

There is urgent need for experiments which will reduce the cost of slash disposal in various types of timber or methods which will make it possible to remove virgin timber and have it followed immediately by a new crop of the most valuable species which will grow on that site. The solution might lie in seeding previous to logging, partial cutting with natural reproduction and a final cut after the remaining timber has been removed or in a more efficient system of slash disposal.

In the development of the farm woodlot, shelterbelt and windbreak in southern Idaho lies a new and important field for research. There is need of greater protection to the crops from drying and scorching winds and more comfort to people and stock. These studies would embrace a complete study of all plantings hitherto made for such purposes and the installation of new experimental and demonstrational plantings under the direction of the state extension forester. Each county agent should learn to appreciate the farm forestry needs and become a booster for them.

To this end and for the encouragement of reforestation on cut-over land it would be well to increase greatly the output of planting stock from the state nursery at Moscow and to establish another distributing nursery somewhere in the southern part of the state.

Another very important line of forest investigation is in protection of the forests from fire. It is stated that Idaho loses each year 20 million board feet of timber. Naturally the efforts along this line would be to reduce the hazard at such points where the fire might be expected to start, to perfect fire protection methods and to bring fire protection into the public schools. This can hardly be called forest research, but there is need for some hard thinking in the development of methods and systems of education which will reduce the present high percentage of man-caused fires in Idaho.

Several ways suggest themselves for the raising of funds for adequate and efficient forest research. It will be sufficient to mention two only. The first would be by direct appropriation; providing for salaries, office equipment, travel and miscellaneous expenses. The other would be in the form of donations toward a permanent fund, the interests of which would be devoted to a research professorship, and fellowships in forest research. These fellowships should be given to Idaho boys preferably, and be made available for study at any institution in this country or abroad. Donations for this fund should be solicited from men who have made fortunes out of Idaho's natural wealth. It is only fair to suppose that such men should joyfully contribute toward the perpetuation of Idaho's natural wealth and Idaho's future prosperity.

The interest from this fund if sufficient should also be used for the publication of results obtained in forest research, in a dignified way and according to a high standard; readable and understandable abstracts should be furnished to various publications within and outside of the state.

THE IDAHO FOREST EXPERIMENT STATION

By F. G. MILLER, Dean
School of Forestry

To meet the growing demands made on the School of Forestry for forest investigations and to facilitate the administration of funds for forestry work, the Board of Education, in February, created the Idaho Forest Experiment Station. This is purely a research unit and is organized as an independent division of the University to serve forestry in the State in the same way that the Agricultural Experiment Station serves agriculture. Forest research has been a major activity of the School of Forestry for a term of years, but a large part of the cost of the work has been made a charge against instruction rather than against research, and the creation of this special research division will make it possible to segregate these expenditures.

One of the early research projects of the School of Forestry was the recovery of by-products from stumps and other forms of wood waste, and an exhaustive bulletin was published on the findings. A little later the state land board called upon the School for advice in the handling of certain state timber lands, and the year following the School responded to a similar request from the department of public works. Recommendations then made are still followed by these departments.

The School assisted the Forest Service in studies to determine public requirements to keep forest lands continuously productive, and co-operated with state officials, state chambers of commerce, the lumber industry, and other agencies in securing legislation to safeguard forest resources. More recently, the School has worked extensively with the federal government in white pine blister rust control, also in the compilation of a handbook on the forest wealth of the state. Meanwhile, fundamental studies have been made in relative durability of Idaho woods, and in finding new uses for our native trees.

Thus it will be seen that the establishment of a Forest Experiment Station does not represent an entirely new movement, but rather it marks definite expansion of an activity long under way. In particular have the demands of the lumber industry for the services of the School increased in very recent years and with the approach of a new era in industrial forestry, it is anticipated that these demands will increase even more rapidly in the future.

Objects and Organization

More specifically, the objects of the Forest Experiment Station are to carry on fundamental investigations in forestry, in order to secure the best use of forest lands, and the most efficient utilization of the forest crop, also to afford training to forest school students in the principles and practice of forestry.

The major activities of the Forest Experiment station are organized in two separate units—The Forest Research Laboratory and the Experimental Forest.

Forest Research Laboratory

The work undertaken here includes problems selected primarily with a view to increasing profits in the lumber industry through the utilization of wood waste. The projects include investigations in the properties and uses of wood, by-products to be derived from wood waste, forest pathology, and wood preservation. This laboratory also encourages the development of research projects in lumber production and utilization to be carried out in co-operation with private, federal, and state agencies, and a number of such projects are constantly under way. The scope of activity includes the maintenance of an informational service for the lumber and related industries of the State, the teaching of forest research methods, and the working out of laboratory theses on forestry subjects by students.

Experimental Forest

The purpose of the Experimental Forest are to demonstrate methods of establishing and growing forest crops, to determine systems of forest management and regulation calculated to keep forest lands continuously productive, and to serve as a field laboratory for the training of students. It is sought to accomplish these purposes through the institution of experiments and studies in silviculture, forest mensuration, forest management, protection, range management, and such other investigations as will contribute to our knowledge of forest tree growth and assist in the solution of forest problems. A considerable number of experiments are already started in

the forest nursery and arboretum, and in the way of permanent sample plots in different parts of the white pine belt. As in the past, the Station will continue to carry on certain of its projects in co-operation with the lumber companies.

Besides the experimental forest of 640 acres in Moscow Mountains, which has served as a field laboratory for several years, there will be selected one or more additional forest tracts within easy reach of the university. The principal area is now under consideration, and final decision will be made the coming summer. It is expected that the Experimental Forest will eventually comprise sevral thousand acres, so located as to typify as large a number of forest conditions as possible, where the field experimental work and out-door instruction will be carried on. The arboretum and forest nursery are also in constant use for experimental purposes, and constitute an integral part of the Experimental Forest.

New Nursery Addition
Showing Position Relative to Campus, 1928

The Need for Research

In Idaho, almost more than in any other state, the prosperity and social welfare of the people are dependent upon the forests. The total area of the state is nearly 54,000,000 acres, and of this area approximately two-fifths or about 20,000,000 acres are classed as forest land. Lumbering and allied timber industries rank first among the manufacturing industries of Idaho, both in the value of their products and in the number of wage earners employed. The total valuation of the industry is placed at $100,000,000 and the value of its products is $41,000,000 annually. The annual lumber cut is about one billion board feet, and if Idaho's forest lands were placed under management, this annual output could probably be substantially increased and maintained indefinitely.

Of the total forest land area of nearly 20,000,000 acres, about 48 per cent still bears commercial stands of timber. The remainder is either logged-off or burned-over land in various stages of reproduction, or is classed as permanent protection forest lying at the higher elevations, much of it at the headwaters of irrigation projects, and therefore exerting an exceedingly important influence on stream flow and irrigation farming.

Certain large grants of land were made by Congress to the State for the benefit of educational and other institutions. A considerable amount of these grants consists of timber lands, of which the state still owns upwards of 700,000 acres. The timber on these lands is conservatively valued at $30,000,000. The University of Idaho has a potential endowment of several million dollars in its own timber grant.

Considering the importance of the lumber industry to Idaho, and the large asset the State has in its land grants, it seems anomalous that relatively so little should have been

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THE BLISTER RUST SITUATION IN THE WEST

By ERNEST E. HUBERT
Professor of Forestry

Introduction

It has been often and truthfully stated that the small things in life give us the greatest concern and certain scientists have gone so far as to state that the human race will be conquered in the end by tiny organisms such as bacteria and insects. We are confronted daily with examples of this unrelenting strife between man and the "microns". In our efforts to grow crops of every description we are forced to wage war upon a host of pests and in our struggles to perpetuate our forest crop so that we may remain a nation of wood users we are faced with problems, the magnitude and intricacy of which would do credit to the fertile brain of the forester's patron saint—Paul Bunyon.

The fight to hold what we have in white pine timber against a tiny but destructive organism, the white pine blister rust, began soon after the discovery of the disease in 1910 at Vancouver, B. C. During the past eighteen years, the disease has spread until today its southern limit is northern Oregon where it threatens the sugar pine stands of Oregon and California. It is well established in northwestern Washington and has flung a battle line eastward across British Columbia, northeast Washington, and has finally penetrated the panhandle of Idaho. That the spread in a northerly direction has been more extensive than in a southerly direction may give us some comfort. But when we consider that the rust has been found to make a jump of 150 miles from infected pine to currant bush we begin to realize that under certain favorable conditions the disease may lead us a merry chase. The spread from currant or gooseberry bush back to pine is limited, however, and may vary from 900 feet to a mile, depending upon the kind of currant or gooseberry.

As in any battle line pushed into our territory, we begin to look for the weak points of attack, and we find in this case that removal of the currant and gooseberry plants snaps the backbone of the rust attack by breaking the cycle necessary for the complete development of this organism. If you will recall how malaria fever was swept out of the Panama Zone by the systematic and, at first, hopeless task of eliminating the carrier mosquito, you will find an apt parallel in our present difficulties. We might liken the spread and intensification of this disease in the white pine areas to the invasion, intrenching, reinforcing, and the advance of an army leaving destruction in its wake. From a few small infections on currant bushes the disease obtains a foothold on neighboring white pines. Its development in the pines is slow at first until the disease reaches the stage where spores are produced that are capable of infecting new bushes far and near. These areas thus become new centers of infection, and the disease spreads and intensifies. The coast of British Columbia has just reached the damage stage and the new infections in Idaho represent the invasion stage; between these two extremes are many gradations.

Investigative Work

The Office of Blister Rust Control located at Spokane, Washington, has been steadily working on this problem and along with cooperating Federal and state agencies has been active in gathering data on the fungus and its hosts; devising and testing methods of control and improving control measures as well as reducing the control costs per acre. These data are gradually pointing the way to practical control measures in the face of a complexity of factors which makes blister rust one of the most difficult problems foresters and lumbermen have been forced to face. The forests of the western timbered regions are teeming with several species of wild current and gooseberry, and along the stream beds solid masses of these plants flank valuable and extensive white pine forests. Fortunately, not all of these alternate hosts, as they are called, are as effective in developing and spreading the disease as is the cultivated black currant which is being rapidly eliminated from the white pine regions. The wild currant and gooseberry plants differ greatly in this respect and this fact has called for a series of painstaking experiments on the part of the Federal workers to determine the relative power of these different plants to develop and spread the disease.

Classification of Control Areas

So far I have given you but a charcoal draw-

ing of the picture, but I hasten to assure you that from the timber owner's point of view there are several bright spots to be added. Based upon the information so far accumulated, we have every reason to believe that much may be accomplished by the adoption of methods of forest management which discourage the development and eventually eliminate the wild currants and gooseberries from the threatened stands. We find that in dense, mature stands the currant and gooseberry bushes are lacking or are so few in number that they can be disregarded. We also find that certain logged or heavily burned areas are also free of these bushes. Data obtained by the Spokane office indicate that there are large areas of timber from pole size on up containing but few bushes of a species so low in susceptibility that they can be disregarded as far as their damaging power to the timber is concerned.

Since fire in general and logging operations or other disturbances of the forest floor increases the blister rust hazard by reestablishing in large numbers the currant and gooseberry plants on the burned areas where white pine reproduction is developing, we have here an additional argument if any is needed, for keeping fire out of the white pine timber. A closed stand and a minimum disturbance of the forest floor reduces the fire hazard and prevents the development of large numbers of Ribes bushes. In the white pine region of Idaho, these facts point to a method of logging that favors residual stands, a minimum duff disturbance and a better protection against fire. That these requirements favoring blister rust control go hand in hand with better forestry practice give us a measure of encouragement.

These data apply more closely to the conditions existing in the white pine type of Idaho. The sugar pine stands of California, on the other hand, offer problems differing widely from those found in Idaho. In the sugar pine stands, fire does not occupy the same relative position of importance as it does in the forests of Idaho. The correlation of forest management and blister rust control in California must, therefore, follow somewhat different leads. With this in view, special studies are to be started in the California region in 1928.

Control Plan

In reviewing the principal elements of a general plan of control, it is obvious, at the outset, that the entire forested area bearing susceptible pines can not be included within the control area. The job would be too huge and too costly, and we would be spending money protecting large units of forested land upon which the total present or future value of the white pines would be so small that the expenditure of control money would not be justified. The choice of areas needing protection, therefore, must be made (1) from areas including commercial stands, and (2) from areas including reproduction stands. All other areas may be excluded. To begin with, this reduces the burden of control appreciably. There are other factors that will aid us in paring this acreage under control down to a less formidable figure. (Heavy burns, double and triple burns at right intervals, dense stands, etc.) It has been roughly estimated that from 60 to 85% of the mature stands in Idaho are practically Ribes free.

The selection of acreage to be placed under control is complicated, however, and the need for control is most pronounced in regions where forest density is great, but where the streams within the drainage support a large number of highly susceptible bushes. Fortunately, the Spokane office has developed a chemical spray which is proving to be an effective weapon of control on such areas. Since reproduction areas are possibly the ones needing first attention, it is well to consider the increasing acreage coming into reproduction each year through the agencies of fire, logging operations, insect and fungus attack, and windfall.

The control problem is not so much concerned with the removal of small numbers of Ribes plants of low susceptibility scattered through the timber stand, but with the high concentrations of such species and also of the very susceptible species.

It is an established fact that young pines are killed by blister rust within a short time after infection. A much longer period is required to bring about the death of larger and older timber. It is estimated that it might require as long as 30 years to kill some of the larger trees. Within this limit the actual period of damage to pines in any particular locality may be shorter or longer than this, depending upon the severity of local infection. No general rule regarding the rate and severity of damage to mature white pines can be laid down with our present knowledge of the problem. It would seem, however, that the meth-

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QUALITIES REQUIRED BY FOREST SERVICE FOR SCHOOL GRADUATES

By C. B. ~~MOORE~~ Morse
Assistant District Forester, Ogden, Utah

It is a pretty big job and a pretty difficult job to put down in writing a statement of the qualities that are wanted in men coming to the Forest Service from the forest schools. I presume that one tackling this proposition is required to say why he is doing so and should be expected to give his qualifications for writing upon such an important subject. As a matter of fact, I had just as well admit at the offset that I do not feel that I have all of the qualifications necessary, but my dear friend, Dean Miller has asked me to do it, and that is the reason for my attempt.

I make no claims to being a psychologist or a character analyst. My only claims are that I have had 21 years' experience in Forest Service work as forest guard, forest agent, which was a title given many years ago when there apparently was nothing else that they could call me under temporary appointment, as assistant forest ranger, as forest assistant, as deputy forest supervisor, forest supervisor and now assistant district forester.

I suppose that the whole question could be answered in a word by saying that the qualities which the Forest Service wants in men coming to them from the forest schools are, in the last analysis, the very same qualities which any other employer wants in men. I have always placed as the first and most important and indispensible quality, the quality of loyalty; loyalty to the profession, loyalty to the Service and loyalty to the particular unit of the organization in which the man happens to be placed. I do not mean that the man necessarily figures that he is always going to stay on the particular forest to which he is assigned, but that while he is there he must take a hold of the work, in fact go ahead with it in full co-operation with the other men on the job and do everything possible to put it over in the most successful way possible. He must expect and give all possible assistance to the other men in the organization and must certainly expect to get their loyal support and assistance in order to accomplish the best results. Elbert Hubbard has said:

> "If you work for a man, in heaven's name work for him. If he pays wages that supply you your bread and butter, work for him, speak well of him, think well of him, stand by him, and stand by the institution he represents. I think if I worked for a man, I would work for him. I would not work for him a part of his time, but all of his time. I would give an undivided service or none. If put to a pinch, an ounce of loyalty is worth a pound of cleverness. If you must vilify, condemn and eternally disparage, why, resign your position, and when you are outside, damn to your heart's content. But, I pray you, so long as you are a part of an institution, do not condemn it. Not that you will injure the institution—not that—but when you disparage the concern of which you are a part, you disparage yourself."

The second quality which the Forest Service demands of its men is industry. This means going to work with a smile on your face, keeping at work and keeping the smile. It means, of course, that whatever the work, whether it be manual or mental that is to be done, it is expected to be done by whomever the job is assigned to. There was a time when a few of the boys coming to the Service from some of the forest schools figured that some of the jobs to which they were assigned were beneath them and that they were wasting a lot of the knowledge which they had gained in four, five or six years' study in school by doing boundary survey or improvement jobs which they figured could just as well be done by unskilled labor. I will, of course, admit that a lot of these jobs could not only be just as well done by unskilled local labor, but probably could be done a lot better and some cheaper. These boys did not realize that if they were to go to positions of higher responsibility it would be very necessary for them to know what an employer can expect of a man in a day's work. They did not realize that it is necessary for the boss to learn by actual experience the standard to which a man can be expected to do a job in a given time. I am mighty glad to say that during recent years we have found mighty little of this attitude in the boys coming to this District in the Forest Service, and

that the result is not so much that the men are staying for a long time in this District, but they are rapidly being picked for positions of higher responsibility in and out of the District.

The third quality which I would call attention to is reliability. Every employer wants to feel that the men he has on his job can be relied upon to do the work assigned to them in the way that it should be done and he certainly wants to know that when a man tells him that a job is completed that it is completed and that he does not have to check up to see that it is completed. It is not nearly so important that a job be done when a man returns from an assignment as it is that he tell his employer flatly whether it is done or not done or only partially done, and so that the employer may know when a job is partially done exactly what part is completed.

The next quality which I would point to, one which really embraces all of the preceding qualities mentioned, is the quality of honesty. This can well be divided into honesty as it is generally understood in financial matters, and into mental honesty. It is much less important that a man in his recommendations agree with his superior officer than that he comes out flatly and says what he actually believes is right in his recommendations, regardless of whether his employer agrees with them or not. Certainly the superior officer's instructions are to be followed but the superior officer wants the honest recommendations of his subordinate and if there is difference of opinion the two can sit down across the table, thrash it out and either reach agreement or the superior can say that he believes he is right and decide then and there the plan or policy to be followed.

The next quality desired by the Service is persistence. By this I do not mean obstinacy, but rather the attitude which will make a man go through with his job and stay with it until it is completed. Too often we get a man who is flashy, brilliant perhaps, ready to start all kinds of worthy things, but he does not stay with them to the finish. Brilliancy is a wonderful asset but it must be combined with persistence for the best success.

The next quality which I would set up as one the Service requires in its men is good personality. By this I do not mean handsomeness, neither any one nor several qualities which perhaps can be described, but taken as a whole it is that combination of traits which make people like one. I presume it requires good health; certainly it requires good temper. It includes getting into the game whatever the game may be and with a will. It includes generosity to the extent that one will bear his share, but it does not by any manner of means require that one do more than his share. It includes most certainly tolerance and consideration which I presume is the opposite of selfishness. It includes most certainly sympathy with other people's opinions, sympathy with the men and women in and around the forest in their troubles and joys, sympathy but not necessarily agreement with their opinions on matters affecting the Forest Service. I would not say that one can be self-centered or opionated, can regularly believe that he is right and the other fellow wrong and have a good personality.

You may well say that all that I have said so far is that which every one knows and you may readily ask why I have said them in a paper of this kind to a bunch of your kind. Perhaps it is unnecessary with you who have lived with Dean Miller and unconsciously absorbed a lot of his wonderful qualities, outlook on life—religion if you please, but you are going to be away from him pretty soon and the Service wants you to keep and enlarge those qualities which he has tried his best to strengthen and fix solidly in you.

The Service wants you to have a good knowledge of the science of forestry. This means to me first of all a good grounding in the fundamental sciences. Next it means as much English, grammar, and rhetoric as you can get. You are going to need these. You need them first of all in the Junior Forester examination. You would be surprised at the grammar used by some of the fellows taking the examination and the obscurity of many of the statements made. Try to develop the ability to make a clear cut, concise statement. Your work in the service is bound to throw you into the position of writing articles for publication and of speaking before schools, clubs and all kinds of other organizations. The more you can develop the ability of presenting your subject clearly, concisely and convincingly the greater success you are going to have. Then, of course, reports on the work done must be made. You must have sufficient knowledge of strictly forestry subjects such as silviculture, management, regulation, utilization, etc., so that

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BEYOND OUR NORTHERN TIMBERLINE

By WILLIAM BYRON MILLER, '22
Assistant Range Examiner, U. S. Biological Survey, Reindeer Investigations,
Fairbanks, Alaska

It is a notable historic fact that in the early settlement of frontier countries the most civilized races have first chosen the timbered regions. Besides furnishing the primary requirements for shelter construction and fuel, the forest ameliorated the climate and afforded protection from storms. Game was also found there in greater variety and abundance and thus areas in or about the forest offered a better means for obtaining a livelihood. These areas were therefore first developed and subsequently became stably populated centers from which progress radiated.

The population of untimbered countries has been more or less unstable, unprogressive, or nomadic, while climate often reached torturing extremes. Although these people may have had sufficient food, drink, clothing, and even shelter they have shown a lack of industry and a hand to mouth fashion of living. For them the wheels of industry have failed to turn.

Civilization has wrapped itself around the world, choosing first the best locations. Then gradually have the hands of progress fashioned means for its further spreading. However,

The Eskimo builds his home in the ground, but he must have wood for framing and bracing it.

With development of means for transportation, forest materials were later carried into the deserts and prairies paving the way for occupation, reclamation, and progress there. It has aptly been said that man requires wood from the cradle to the grave. No single factor has contributed so much to the upbuilding of the nations as an adequate supply of suitable forest materials. The forest has formed the foundation for industry, progress, and prosperity; contributing to pleasant surroundings and human happiness.

certain areas have defied man's progress, almost his existence. As this is true of the great unconquered deserts it is likewise true of the arctic regions where lives the Eskimo. Like the nomad of the burning sands with his steed and his camel is the Eskimo of the treeless arctic with his sled, his kayak, and his oomiak. Beyond our northern timberline, with no vegetative crops for his consumption, where the open lands are often swept by storms and blizzards, he lives. And for how many centuries has he lived thus, eating largely fish,

Trees by the thousands are undermined by the current, falling into the streams they are borne to the sea.

fowl, and animal, dressing in skins and furs, and digging his home in the ground to keep from freezing in winter, or constructing more temporary spring and summer camps of ice or skins.

Alaska's northern timberline separates generally the Alaskan Indian and the Eskimo. The northern Indians being men of the forest and mountains occupy the timbered country while the Eskimo has chosen the great treeless tundra beyond, usually along the shoreline which separates sea and the prairie-like tundra country.

The desert dweller conserves water, but the Eskimo must hoard and wisely use what wood he finds in the land where no trees grow. The Eskimos along the untimbered coast of Alaska and the islands of Bering Sea are dependent on interior Alaska for most of the wood they use for fuel or construction purposes. The frames of their kayaks, the spear shafts, sledges, and logs for framing and bracing inside their earth houses are obtained from driftwood. If wood is too scarce, Eskimo houses are built in the ground like dens.

The streams in the interior of Alaska usually originate in the high glaciered mountains. Down in the lower levels they flow through timbered valleys. The drop of the water level is then only a few inches per mile. As a consequence the streams meander about, forming ox-bows and cutting many new channels. As the current cuts the banks trees by the thousands are undermined and fall into the stream. While yet attached to the bank and with their trunks in the water these trees are known as sweepers and constitute a menace to boats navigating the streams. Gradually loosened by the current they drift into the sea. The sea currents carry the logs about and finally distribute them along the coast, or the shores of islands. In many places beached logs may be found in abundance. However, this is unusual and wood is generally scarce rather than plentiful along the beaches. Nevertheless where man finds wood, fish, and game he chooses the site for his home.

Thus has nature furnished the means for man's abode about the shores of the great untimbered "barren ground". Much timber is first produced in the fertile valleys through which meander the sluggish silt laden streams, ever building, ever wearing away. The changing currents furnish means for harvest and for transportating the woods to the shores of the

Sea currents carry the logs about. Finally they are distributed along the shore—they form the Eskimo's wood supply.

great open country. The Eskimo selects a place to live where fish, game, and sufficient wood may be obtained to serve his primitive needs. He fashions his weapons and utensils, his sled, and kayak frames, constructs his dwelling and collects his fuel from the driftwood along the beaches. Truly phenomenal is the wise provision of nature.

THE IDAHO FOREST EXPERIMENT STATION

By L. F. PARSONS
Executive Secretary, U. of I.
Delivered at the Annual Banquet, March 7, 1928

The organization of Idaho's Forestry Experiment Station is but another advancement in the growth and development of our School of Forestry.

It is a further recognition that Forestry is something more than the production of 1x12's and 2x4's; that Forestry involves a knowledge of all of our fundamental sciences, both natural and social, and that the lumber industry needs the assistance and help of technically trained men—scientists.

The establishment of the Forestry Experiment Station by the Regents of the University is a recognition of the ever increasing service that the faculty of our School of Forestry has been rendering since the organization of the school.

At first their services were utilized only by the comparative few that recognized and believed in conservation and continuous production in the handling of our forests. Our lumbermen were slow to accept this idea. In the past few years more and more of them have had cause to stop, look, and listen. They have had cause to look back over their trail across Pennsylvania, Michigan, and Wisconsin. They have noted the barren lands, abandoned mills, and dead lumber towns. They now recognize that a continuation of their past methods for another thirty or forty years means that millions of dollars now invested would be out of work and they, as lumbermen, will be jobless. Self-preservation makes necessary a much modified policy in forest management.

Our lumbermen are now ready to accept in part, at least, the theories of the white-collared lumber-jack, conservation, continuous cutting and the full utilization of the potential possibilities of our timber lands. In

doing so they recognize and accept an increased cost of operation. To offset this, they must find an increase in income.

Where is this increase to come from? That is the question the lumberman is now asking of Idaho's Forest Experiment Station. Shall it come from the third of each tree cut that is now waste? Shall it come from new uses for our larch, cedar, fir and spruce, or will it come from a decrease in loss from fire, decrease in loss from chemical reactions and from plant and animal parasites.

Assisting the lumber industry in answering these questions is one function of the new Station. Its major and largest function shall be to assist the State Forester and the State Land Board in the management and development of the forest lands belonging to the State. The State of Idaho itself is one of the largest single owners of forest lands in Idaho. I know not the total acreage, but it is many hundreds of thousands. These lands belong to our common schools, our institutions of higher learning, including the University, and our penal and eleemosynary institutions. Their management has been delegated to a very large extent to the State Forester, Mr. Ben Bush. It develops upon him to conserve, protect, utilize, and develop these lands in such a manner that they will ultimately yield the greatest income. Through his leadership the State Land Board has adopted one of the most advanced forest management programs. In doing so they have raised many questions.

What can be done with the thousands of acres of cut-over and burned-over land belonging to the counties and the State? How can a market be developed for billions of feet of lodge pole pine and other second and third grade species? What must we do for the protection of the watersheds so essential to our irrigation farmers? The State Forester is now calling upon the Forest Experiment Station for assistance in answering these and many other questions vital to the welfare of all Idaho.

A further service to be rendered by the Station is co-operating with and lending service to the National Forest Service in solving problems peculiar to Idaho in its management of the large timbered area held by the national government.

The demand for service from the School of Forestry by the State Forester, the lumber industry, and the Forest Service has increased rapidly during the past few years, but it is anticipated that this demand is going to increase much more rapidly in the immediate future. To better meet this demand and to be able to give more and better service the work of the School of Forestry is reorganized and the Experiment Station is created.

It is regrettable but true, the lumber industry has been slow in recognizing the value of technical and scientific service. For many years the mining industry has spent much for research, the Federal and State Governments have contributed toward this research through the Bureau of Mines. Even the poorly organized industry of agriculture has recognized the value of experimentation, and today our tax payers are contributing millions for the advancement of agriculture. In our Agricultural Experiment Stations we find the agricultural chemist, physicist, bacteriologist, entomologist, plant physicist, engineer and economist. Why do we not have similar titles in forestry and why do we not have public funds expended for research for the advancement of the lumber industry? Because our lumbermen have been asleep. They have slept so hard and long as to permit other industries through research to substitute metal and composite material for wood. They have lost a considerable part of a market that is rightfully theirs. They are now awakening to the needs of their industry. The general public is also awakening to the value of our forests as a state and national asset. From both of these sources, we may expect many demands for service. The future growth and development of Idaho's Forest Experiment Station depends upon how these demands for service are met. Director Miller, you foresters, assistant foresters, and would be foresters, it is up to you. Go to it.

UTILIZATION OF WOOD WASTE

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hold on until the crisis is past. It seems to me that quick action is imperative and that speed is the indispensible requisite under existing conditions in the lumber industry.

My prescription for the patient is: Equal parts of by-products and of chemical derivatives, with concerted and persistent movements to eliminate all unnecessary waste. I leave it up to you to get the prescription filled before it is too late.

RECREATIONAL USES OF IDAHO FORESTS

By LEON NADEAU

This essay won the first prize of $50.00 in the state-wide Forestry Contest sponsored by the North Idaho Forestry Association as a feature of the American Forest Week. The contest was open to all high school students in Idaho ,and was participated in by over one thousand contestants from all parts of the state. The winner, Leon Nadeau, is eighteen years of age, and a sophomore in the Garden Valley High School.—Editor.

It is spring again, and the snow is swiftly melting away. Close at its heels tiny blades of green grass spring up and wild flowers push their way through the ground and up, up, until the swelling bud bursts into a beautiful lily, a crocus, or a daisy. The bushes on the slope and the willows along the brook are leafing out while in their green foliage birds twitter and sing as they build their homes of straw and mud, or huddle over their tiny speckled eggs. High over head a flock of wild geese honk faintly as they fly swiftly on their way to the north, now flying in a long straight line, now forming a great "V" which slowly fades and the flock molds into a mass of speeding black dots that gradually disappear.

In the marshy pasture the frogs croak in mechanical unison. From a thicket of reeds across a swamp, a rail calls to its mate; a grey mallard hen rushes out from under a broken tree top that has fallen with its branches in the water, and goes darting in and out among the reeds and clumps of grass along the bank. A few minutes searching beneath the old tree top reveals a nest of small, pale green eggs, slightly dotted. On the other side of the marsh, a young forest of pines has grown on a slight raise of ground. Grey squirrels dart hither and thither or sit vertically and statue-like at the mouth of their underground homes, then with a warning shriek they plunge into the ground.

A twig snaps in a thicket of low bushes ahead, the branches part and a timid doe steps into the clearing, holding her head high and her ears bent forward, while her sharp eyes search everywhere for some unseen enemy. Then, as she lightly steps forward, a tiny spotted fawn takes form out of the background and bounds nimbly to the side of its mother. Yes, no doubt it is spring and the dreary gloom of winter has been cast off, just as one draws back the curtains of a dark room flooding all with light and sunshine, giving new life to the world.

Today, the roar of the automobile on the highway announced the coming of the pleasure seeker and the tourist. Soon the muddy, turbulent streams will grow calm and clear and sparkle in the sunshine, and the speckled trout will again lurk in the dark pools and wait for the anglers fly and rod to out-wit him. Then will the cities pour forth their people, young and old, in automobiles of every description, shining with new paint and nickeled radiators, old cars with patched tops and loose wheels, cars for two, and cars for ten, all with beds and provisions lashed on the sides and backs. Each will vie with the other for the open road to the hills and the wary trout that swim in the clear, cold, mountain streams.

Some will not be satisfied with the streams frequented by the public, and will hire horses from the "Dude Ranches" or packer's service stations to pack them and their supplies far back from the well beaten path of the tourist, where the trout are plentiful and strike harder. There, in the depths of the forest, they will pitch their camps and enjoy nature unmolested.

Later, in July, when the "Chinook" and the "Steel Head" run, the automobiles will be armed with long handled spears and the occu-

pants will carry rifles between their knees. Then the trout shall enjoy a rest. The cars will speed on and on into the heart of the forests, to the salmon waters and the greatest sport of all.

Other people love a lake. For these, there are many. Large blue lakes rippling in the breeze and reflecting like a sea of diamonds in the sunshine, bordered on all sides by dark cool frests and green meadows. Here the fish are abundant and boats are at all times available to those who have a desire to row or cast their lines. Then there are the cold, crystal lakes of the high country, only accessible by pack horses over rough mountain trails. These lakes are especially favorite haunts of lusty rainbow trout.

All through the summer these tourists will continue to come and go, some for pleasure, some for health; some remaining only a day, and others weeks and weeks; many to build summer homes in the woods and to live the entire season in the seclusion and fastness of the hills.

In September the grouse, the blue, the sage, the ruffed and the pintail, all will attract great numbers of hunters and sportsmen. Men of every profession will join in the pursuit of the game birds that are found here in the forest. For these men, there is but one heaven, a gun, a dog, a light heart, and an open field where the game birds are abundant.

In October, when leaves are red, and the morning crisp and frosty ,there comes still another flood of eager huntsmen, and again the woods will ring and echo with the crash of guns. Ah, how proud is the man who seeks out the haunt and brings down a fine young buck with a beautiful spread of antlers as a trophy. Countless are the innocent deer that fall before the deadly aim of the hunter during the short four weeks each fall.

Still greater prized are the elk of the higher valleys. These huge red beasts, with their great horns and nimble feet, outwardly show their contempt for man. Though they are protected in most regions, there still remain a few small areas where the hunter is free to hunt and kill his elk each fall. Still farther back and high up the rough mountain crags are found the mountain goat and the mountain sheep. The goat with his glossy white coat and sharp black horns promises a real thrill to anyone who wishes to pursue him in his natural habitat, the most rugged and barren mountain peaks and cliffs that Mother Nature can present. The mountain sheep also ranges high on the more rugged slopes, but seldom is found to be as daring and active as the goat. Until recently, this sheep attracted many hunters with his huge curled horns, but in the last few years a law has been passed to protect the few of these noble creatures that are left, so now it remains only for the hunter to pursue him with his camera.

This type of hunting is rapidly becoming a popular sport in all parts of the country where game animals are found. Many, who all their lives have hunted with heavy rifle and steel pointed bullets, now discard their deadly weapons for a camera with lenses and films. These men, who once strode steadily through the woods with ever a watchful eye and listening ear, or crept to the top of a ridge to peep over the other side, with rifle held ready to fire the instant some wild creature exposed itself and bring it to the ground lifeless merely for the sake of sport, now tread the same trails and lie in ambush beside the same paths with just the same caution and care as before, only their shots are harmless and the hunted creatures, though they have filled the hunter with emotion and triumph, are still free to live and roam in peace.

Now it is November, and all things denote that winter is swiftly descending upon the world again. Soon all will be buried beneath a great blanket of snow. The leaves that only a few weeks ago were green, then red and yellow, have fallen to the ground. The once green meadows, dotted with flowers and humming bumble bees beneath a summer sun, are now brown and barren, dotted here and there with pools of muddy water from the recent rains. To the north and to the west the great mountain peaks have long been enshrouded in snow which gradually with each storm descends further down the slopes. Soon it will reach the foot hills and then the valleys and the world will again be held in the grip of winter.

First, just before the final close, the great flocks of ducks and geese we watched as they flew north last spring will again take to the air and migrate toward the south. These great flocks will stop here and there to feed on the way usually in the stubble fields of the open

valleys or along the marshy shores of the larger rivers and lakes. Then again comes the time for hunting. The old shot gun comes out from its musty hiding place in the basement and dons a new luster. With it a large supply of shells, a rain hat and slicker, rubber boots a fine drizzle of rain, a dog, then as the flock passes over, what a thrill!

And yet these various sports are only a few of the many forms of recreation to be found in the forests. Hikes, picnics, horseback rides, berrying parties, and countless other entertainments are free to the public.

Summer resorts, situated in the most beautiful places, on shores of glistening lakes, on the banks of mountain streams, in the heart of a deep dark wood, everywhere that ususual beauty and typical mountain scenery are found, attract hundreds of pleasure seekers as well as health seekers.

Great areas of rough, unsettled timberlands and mountain streams form a complete heaven for the prospector with his pick and shovel. He may roam to his heart's content, digging and washing, tramping and camping. What a life for a carefree soul!

Yes, many are the ways in which the great open spaces of Idaho may be used for recreation. Hunters, fishers, campers, health seekers, prospectors, and tourists from every corner of the continent view the beautiful mountain scenery. Tired business men, who day after day bend over their books and papers, push all aside and seek out some secluded spot in the forest where they are free from worry, and enjoy a quiet peaceful rest.

Then is it any wonder that the Forest Service, which so carefully guards the timber lands and fosters the growing vegetation, pleads each year with the public to help protect the source of all this recreation? Each year, regardless of the precaution taken against fire, large areas are destroyed and laid waste. Not only are the woods destroyed, but many innocent forest creatures also perish in the flames, burned at the stake through the carelessness of some reckless person.

These burned-over areas may be seen frequently as one travels through the mountains. Great open spaces, crisscrossed with charred logs, and here and there a black snag, lonely and plain, gives the impression of black crepe, the symbol of death, and indeed it is a fitting symbol for years and years only black snags and charred logs adorn the earth. This forms a striking contrast to the fresh, green forests on either side of the burn, with their towering pines and thickets of vegetation, cool, clear streams of pure water, blooming flowers, and berry bushes, and best of all the many wild creatures living therein.

These vast recreational resources should be preserved, and it is the part of every person to help preserve them. All persons enjoying some type of recreation in the forests should thoroughly understand the destructive powers of an unextinguished campfire or match. Through these agencies, the rare beauty and the cold spring by the shady nook, where one camped last summer may with the coming of the next camping season be a scene of grim desolation and the refreshing spring has disappeared forever.

So be it the motto of all who find recreation in the forests whether national, state, or privately owned, to put out every spark and strive to prevent forest fires.

EPSILON BECOMES GRAND CHAPTER

Epsilon Chapter of Xi Sigma Pi, national forestry honorary fraternity has accepted the duties and responsibilities of Grand Chapter of the organization for the years 1928-29.

As a result of such acceptance, the following members of Epsilon Chapter were nominated by the local chapter and elected by vote of all chapters to the following national offices.

Harry I. Nettleton....................................Forester
Arthur M. Sowder.............Associate Forester
Wallace M. Saling...Secretary-Fiscal Agent

Upon these men rests the responsibility of directing the national business of the fraternity during the next two years, in accordance with the plan of rotating the leadership of Xi Sigma Pi from one chapter to another.

In accepting the leadership of Xi Sigma Pi, Epsilon Chapter should strive to become the strongest and most active in the fraternity, not only in affairs of the fraternity, but also in the upbuilding and closer coordination of the Associated Foresters in all worth while activities.

SCHOOL MAKES 100 PER CENT RECORD IN CIVIL SERVICE EXAMINATIONS

This year six men took the Junior Forester Examination in March. The School is proud of the record made, for all the men passed with very creditable ratings.

OBSERVATIONS ON THE IFLUENCE OF RODENTS ON IMMEDIATE REPRODUCTION FOLLOWING LOGGING IN NORTHERN IDAHO

By ALDEN B. HATCH, '28

Introduction

The absence of immediate reproduction following logging on a few areas in the western white pine type of northern Idaho is considered sufficiently serious to warrant research investigations. Some of the lands which are offering this difficulty are timber sale areas which have had several seed trees left per acre, and which have not burned over subsequent to logging. With such treatment one would ordinarily expect adequate and immediate reproduction. Occasionally, however, such has not been the result. Several years, and often a decade or more have passed before the areas have had sufficient reproduction to be considered adequately stocked (one established white pine seedling per milacre). The western white pine area is probably the only timbered area in the west, exclusive of the humid coast forests, which is at present considered to yield sufficient financial returns to interest private capital in growing timber on a sustained yield basis. Lengthening the rotation only a decade may greatly affect the financial returns of growing timber. It is desirable, therefore, that immediate restocking be secured. To this end the Northern Rocky Mountain Experiment Station is conducting a rather extensive series of experiments. The plan is to determine just what is taking place on these sale areas, and also to determine the truth regarding certain theories which have been advanced to explain the phenomenon of delayed restocking. It was while the author was working on these experiments that an opportunity arose to observe the effect of the Douglas squirrel (Sciurus douglasi) on reproduction in the western white pine type. This observation and the partial results of a preliminary study of certain factors affecting reproduction of western yellow pine in northern Idaho (in preparation by the author) will be presented in this paper.

Theories for Delayed Restocking

The theory which is probably referred to most often when discussing delayed restocking in this region is "The Stored Seed Theory." Laren (6) found that certain burned areas which apparently had no possibility of receiving seed from trees gradually restocked, and some reproduction came up five to six years after the source of seed had been removed by fire. He concluded, therefore, that the seed was probably stored in the half burnt duff and remained dormant until conditions became suitable for germination. The same tendency toward restocking after severaly years is found on the timber sale areas in question. The general belief, therefore, is that this apparent habit of white pine seed to lie dormant for several years is the cause of much of the delayed restocking on sale areas. Marshall (7) attributes many of the difficulties encountered in the western white pine type, including poor reproduction on timber sales, to a present periodic deficiency of precipitation which started about the time the Forest Service took over the management of the National Forests. He bases this observation on an analysis of tree growth in five age classes the youngest 75 years old and the oldest 280. An exceptionally dry year following logging or too long an interval between a seed year and time of cutting, are also given as causes of this lack of reproduction following logging. It may also be contended that insufficient seed trees are left on the sales to restock the area in a short time, provided the seed in the duff have failed. Duff is usually somewhat acid and it is often considered that seed will not germinate until the duff has become sufficiently disintegrated through oxidation, which is greatly enlivened by the increased warmth from the sun after logging. It seems that it would be difficult to place the cause on any one of these, or perhaps, other factors. Each of them probably has an individual influence in giving the reproduction conditions we find. That the rodent factor has an important bearing on the question has been known for several years. It has been demonstrated by Pearson, Weidman and many others that rodents become a deciding factor in delaying, and indeed in some cases, completely eliminating reproduction in the western yellow pine type. Willis "found that ro-

dents and white-footed mice in particular destroy a large percent of field sown seed."[1] In fact the method of securing reproduction by seeding has been abandoned largely because of rodents. Cox believes "that if western yellow pine bore a uniform crop of seed each year, the animals which feed upon the species might soon become so numerous as to seriously endanger the existence of the tree as a part of the forest."[2] If this is actually the case years of maximum seed production may fluctuate not only with climatic conditions but to some extent because of inherent qualities. The latter presumably is caused by animals destroying all the seed except in abnormal years for many centuries. This paper, however, will deal with the less abstract. As it is not desirable in the present discussion to review the literature available on rodents the author refers to an article by Taylor (9) who in addition to presenting a valuable outline of the biological side of forest production refers to the writings of a number of investigators of rodent activity. The following data, though meager, agrees with the findings of many of these investigations and in addition points to a possible cause of some of the delayed restocking in the western white pine type of Northern Idaho.

Data from Western Yellow Pine Type

In August, 1925, the Craig Mountain Lumber Company commenced logging a portion of the Nez Perce Indian Timber Reserve on Craig Mountain near the northern boundary of Lewis County, Idaho. By March, 1926, the Company had logged the area and was withdrawing. In Section 9, T 34 N, R 1 W of B. M. a strip of timber a quarter of a mile in width and a mile in length belonging to a private owner was not cut. Thus a strip of virgin western yellow pine timber was left intact, bounded on three sides by a freshly clean cut area and on the fourth side by farming land. In June, 1926, a set of three seed traps was placed in one end of this strip near the logging boundary. The site was a gentle slope in a small opening which had a little advance reproduction of various ages. Two of the traps of the set were so constructed as to exclude rodents, and the third was an open trap which would enable rodents to enter and eat the seed caught if they so chose. The traps were each one yard square. Early in the spring of 1927 after the snow had melted the traps were examined. One of the closed traps (B) had 62 seed and the other (A) had 127, an average of 96 yellow pine seed per square yard. The open trap had 28 seed, making an average difference of 68 seed, or 70.8% between the open and the closed traps. The seed from trap A (having 127 seed) were collected to determine the germination per cent.[1] This was found to be 47.3%. The 62 seed from closed trap B were scattered over the ground where the trap stood, and the top half of the trap, consisting of five inch-high walls and a screen of one-half inch wire mesh, was turned over the area to exclude rodents until germination took place. The seed in the open trap were left in the trap. The set was again examined on June 15, 1927. Of the 62 seed from trap B scattered on the ground 31, or 50%, had germinated. Each seedling was staked and the cover removed entirely to eliminate any effect it might have on conserving moisture. The number of seed in the open trap had reduced from 28 to 9. The area around the set for a radius of about 75 feet was thoroughly examined by six persons. Not a single seedling was found. During the summer four more seeds germinated, making a total of 35, or equal to 57% total germination. Three seedlings died and the number of seeds in the open trap were reduced from 9 to 6. Assuming that 57% (germination per cent) of the disseminated seed crop was capable of becoming seedlings on the surrounding area (as is indicated by these data), rodents or birds prevented the germination of over 508,000 seedlings per acre. It should be noted, however, that the forest in question did not, as a whole, offer conditions so good for germination as did the area in the vicinity of these traps. It is believed that this is due largely to the lack of suf-

1. Willis, C. P. *The Control of Rodents in Field Seeding* Proc. Soc. Am. For. 9:365-379 July 1914.
2. Cox, William F. *Reforestation in the National Forests* U. S. Dept. Agr. Forest Service Bul. 98 P 16 1911.

1. The germination per cent was determined in the University of Idaho greenhouse. The soil was first sterilized by steam in a dry kiln. The first seed germinated 13 days after planting, on the fourteenth day ten seeds germinated and on the fifteenth day twenty-five. The following two days nine and seven germinated respectively, and then all germination ceased. No cause for this sudden ending was isolated but is very probable that some form of organism caused it as the total germination was only 47.3 per cent while actual field germination was 57 per cent.

ficient warmth in much of the forest.[1] The seed remaining in the open trap after the summer of exposure, equal to 6.2% of the seed crop per square yard, indicate that 93.8% (100-6.2) of the disseminated seed crop was destroyed. That even a much larger quantity of seed were destroyed is probable in view of the hoarding characteristics of squirrels. Table I. gives the results in tabulated form.

These data indicate that some form or forms of animal life have a perceptible influence on the volume of seed available for germination. The only animal actually observed on the area was the Douglas squirrel, which had a cone cache a few hundred feet from the seed traps. It is probable that the covering of the germinating seeds might have conserved moisture, and thus have increased the germination per cent. It is not likely, however, that it would have caused the difference between the 0% and 57% germination found on this area. If moisture had been the limiting factor certain small areas protected by brush should have had at least a few seeds germinate. If this point is still objectionable, one can hardly ignore the reduction of the number of seed in the open trap between the first examination and the end of the summer. Clearly this was due to animal life.

While this experiment was in operation nine other identical sets of seed traps were collecting seed in a virgin yellow pine forest near Potlatch, Idaho. There was no logging area within several miles of these traps. Examination of the data on this area reveals that seed reduction in the open traps was not as severe as on the Craig Mountain area. Reduction of seed in the open traps after examination appears to be somewhat local in character. Half of the six sets had no reduction of seed between examinations and the other half did. This indicates that presumably the rodent population was not uniformly abundant throughout the forest.

Table II. gives the number of seed from the Potlatch sets on the examinations of December 22, 1926, and June 17, 1927.

1. Qualifications for this statement will be discussed by the author in a future paper. "Certain Factors Affecting Reproduction of Western Yellow Pine in Northern Idaho." Briefly this study revealed that germination occurred more frequently on the very open sites than in the comparatively dense virgin stands. 1927 was an abnormally wet year in this region and even the most exposed sites were still moist in early June. Moisture, therefore, played a minor role as a limiting factor in germination while heat, as related to sunlight, appeared to be closely related to germination. Survival is limited by other factors than is germination and should not, therefore, be linked too closely with the latter.

The 94 seed remaining in the open traps on June 17, 1927, is equal to 47.7% of the 197 seed distributed in the closed traps. In contrast to this the Craig Mountain set showed a difference of 91.4% (nine seed found on examination of June 15—91.4% of 96 seed in closed traps). Evidently a considerable number of seed are unmolested and so are available for germination in this virgin forest which has no adjoining logged over area. It is probable, therefore, that rodents in such a forest are normally distributed and do not constitute a severe menace to reproduction.

Observations in Western White Pine Type

The second opportunity for observing rodent activity was offered while aiding in the establishment of Management Production Plot No. 134 for the Priest River Experiment Station, Priest River, Idaho. The plot is located in the western white pine type on the 1926 Big Creek timber sale, Kaniksu National Forest. On August 10, 1927, a large white pine seed tree was noted to have an excellent cone crop. By August 15th squirrels were observed in the act of cutting cones for hoarding, and the ground had quite a number of cones scattered over it beneath the tree. Examination of the seeds revealed that they were not quite ripe. I wish to emphasize the fact that squirrels were seen in the act of cutting these cones from the trees. On August 30th this tree was tagged, measured and phenological observations taken. It was entirely devoid of cones and the ground was bare of them also. During the first few days of September phenological observations were made on Management Reproduction Plot No. 136. This plot is on the Fox Creek drainage within a mile of Plot 134. Seed trees with cones were very rare and squirrels were noted to be hoarding here also.

Summary

The conditions caused by clear cutting in the western yellow pine type are such that there is probably only one course of action open to rodents, namely, migration. In the case here presented movement was into an adjoining uncut virgin forest . The increased demand for food caused by this migration was such that the entire seed crop of a maximum seed year was utilized. It seems evident that a demand which will completely utilize a seed crop during a year of maximum seed production will greatly exceed a supply of a normal seed year. It is believed that the excessive

number of squirrels, field mice and other rodents will, therefore, be reduced somewhat in accordance with the economic law of supply and demand. On this area the supply, food, cannot increase; accordingly the demand must decrease. This reduction of rodents may be by starvation, further migration, or death from disease caused by weakened vitality. Animals or birds which prey on rodents may also increase and eventually the rodent population may be less than under normal conditions.

A virgin western yellow pine forest which is not in close proximity to a logging area probably has a normal rodent population during a good share of its life history. If the rodent population at the time of this experiment was normal, the data from 18 square yards of area in seed traps indicates that on this area rodents destroyed about 53% of the dispersed seed of a maximum seed year. They did not, therefore, completely eliminate reproduction.

The results are somewhat different on Forest Service timber sales because of the method used in procuring reproduction. In the western white pine type several seed trees and a considerable number of immature trees are left on each acre of a timber sale. Accordingly some food remains, and plenty of shelter for new homes for the squirrels and other rodents. There probably is as a result very little migration unless the sale unit is very small and virgin timber is close by. The result on some of those areas which have not restocked immediately probably is that during the first three or four years or more very little if any seed accomplishes the purpose for which the seed trees were left.

If the law of supply and demand is again

TABLE I

Tabulated Results of Examinations of Craigmont Traps

Area	Seed found on examination of March 15, 1927	Germination by June 15, 1927	Total germination of seed at end of summer of 1927
Surrounding area	Not examined	0	0
Open trop	28	Number of seeds reduced from 28 to 9	Number of seeds reduced from 9 to 6=6.2 per cent of original seed crop of 96 per sq. yd.
Trap B closed	62	31	35=57 per cent
Trap A closed	127	Collected for Germination Test	

TABLE II

Tabulated Results of Examinations of Potlatch Traps

Set number	Average No. seed in closed traps of set	Number of seed in open traps of sets	Difference between open and closed traps	Number of seed in open traps June 17, 1927
1	81	43	38	46
2	21	19	2	19
3	16	11	5	3
4	8	4	4	4
5	37	28	9	17
6	34	23	11	5
Totals	197	128	69	94

operative in this instance it would seem that the rodents would be reduced to normal or below in a few years and then seeding would occur. In the western white pine type restocking actually does occur in some cases a few years after logging and consequently is coincidental with this supposition. It is also peculiar, or perhaps natural, that the stored seed theory on some areas coincides in like manner with this actual time of restocking.

Recommendations

Too many mistakes have already been made to remind us that we should not blindly advocate legislative or other means of exterminating seemingly destructive but often beneficial animals. There are too many monuments to wanton destruction, the Great Auk, the Passenger Pigeon, the Prong Horned Antelope, to remind us of man's avidity. Let not the forester contribute ever so slightly to this ever mounting shame. Intensive and thorough investigation only should guide our actions against the inhabitants of the woods. It is hoped that along with other investigations to determine the cause of delayed reproduction in the western white pine type, this problem may be considered.

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THE RELATION OF THE MOISTURE CONTENTS OF SAPWOOD TO THE DEVELOPMENT OF A BLUE STAIN ORGANISM

A. R. COCHRAN, '28

Introduction

The loss from blue stain to the lumber industry of the United States is estimated to amount to ten million dollars annually. This loss is the result of degrade due mainly to discoloration. The presence of the fungus threads in the wood causes the characteristic bluing from which comes the name "blue stain." The wood so affected can be utilized when it is covered or painted, but cannot be used where the clear natural finish is desired. The blue stained material falls into a lower grade than it otherwise would. As a consequence it commands a correspondingly lower price, hence the loss to the producer. (1)

Investigation and research into the factors favorable or unfavorable for the development of blue stain have been very meager and by no means commensurate with the magnitude of the problem. Munch worked on the moisture relation of one of the sap stain fungi **Ceratostomello coerulea** in the sapwood of Scotch pine. (4) No work has been done in this particular direction, however, on our native timber species. It is suggested that Munch's results hold only for woods of about the same density as Scotch pine and that they would not apply to lighter or heavier woods. It is with the aim of throwing further light on this phase of the problem that this study is conducted. (3)

Object of the Study

The object of this study is (1) to determine if possible the maximum, optimum, and minimum moisture contents of wood favorable or unfavorable to the development of blue stain, and (2) to correlate the matter of moisture content with the specific gravity of the wood affected.

cured by a spring clip. This allowed an exchange of air in the jars.

The jars thus prepared were placed in the Freas electric oven for 48 hours at a temperature of 100 degrees C. At the end of this time the jars were removed from the oven and allowed to cool. About one-half inch of distilled water was then introduced into the

TABLE 1

Species Sapwood	Specific Gravity	Rings per Inch	Upper Limit of Maximum Growth[1]	Upper Inhibition Point of Growth[1]	Source of Fungus
Liquidamber stryaciflua	.526	16	1.87	2.33	Ceratostomella sp. from sap red gum collected in Tennessee
Tilia glabra	.455	16	2.20	2.35	
Pinus monticola	.458	12	1.87	2.11	Ceratostomella sp. sap of yellow pine collected in Idaho
Pinus ponderosa	.304	18	1.90	1.98	
Pinus lambertania	.242	46	2.34	2.67	

1. Average moisture contents (per cent of moisture over dry weight bas'-) of eight test pieces.

Methods Used in the Study

Preparation of material: Four test pieces one-half inch square by fifteen inches long were ripped from boards of the sapwood of each of the following species, **Liquidambar stryraciflua, Tilia glabra, Pinus monticola, Pinus lambertiana, and Pinus ponderosa.** The test pieces were divided into two seven-inch lengths and a one-inch length, the latter being cut from the center of the original fifteen-inch piece and used for specific gravity determination. The seven inch pieces cut in this manner were permanently numbered and numbers recorded. One of the seven-inch pieces was reserved for inoculation and one for checking the ascent of water and the distribution of moisture contents along the different parts of the stick. Two quart wide-mouth Mason jars used for culture jars were numbered, and the numbers and contents recorded. Two test pieces were placed in a jar and inoculated. Two pieces, the mates to the first two, were placed in another jar for checkpieces or controls as mentioned above. Another set of the same species was prepared in this same way, thus two sets were prepared for each of the five species used in the test. Each jar was capped with cotton which in turn was covered by a metal lid and se-

bottom of the jars. Former tests conducted in the laboratory by Dr. Hubert showed that in general there is a gradient in moisture per cent contents of a stick of wood, which diminishes from the water level to the top of the test stick. The sapwood sticks of certain species do not show as regular a gradient as does heartwood.

The jars were set aside for a week to allow the moisture to rise and become distributed throughout the test pieces. At the end of this time the moisture-contents-control jars were set aside and the jars containing the test pieces for inoculation were inoculated. The inoculum used was grown on a three per cent malt agar media. The hardwood species were inoculated with blue stain **Ceratostomella sp.** from sap gum collected in Tennessee, and the softwood species with blue stain **Ceratostomella sp.** from yellow pine collected in Idaho. The inoculation was done in a specially designed culture case. These jars were put aside for a time sufficient for the development of the blue stain organisms.

Determining the specific gravity of the sapwood of the different species was accomplished by: (1) Obtaining the oven dry weight of the one-inch blocks from the middle of the fifteen-inch test pieces, after 48 hours in the

Freas electric oven at 100 degrees C.; (2) the blocks were immersed for an instant in hot parafin for the purpose of waterproofing them; (3) the weight of the displaced water was obtained by immersing the blocks in water. A torsion balance weighing to the nearest tenth of a gram was used in this work. (4) The weight of the oven dry block was divided by the weight of the displaced water to obtain the specific gravity; (5) The final value was found by averaging four trial values.

The number of rings per inch was taken as an average of four counts. The texture of the wood was such that this average would be accurate enough for the purpose of the study.

Conclusion of Laboratory Experiment

The spread and distribution of blue stain and the fruiting bodies on the four surfaces of the test sticks were recorded on a blank form drawn to full size scale for the four sides of the test stick. A ruler was placed beside the test sticks to facilitate this measurement. These records were made before the sticks were removed from the jars. The next step was to find the distribution of moisture at regular intervals along each stick, expressed in moisture per cent on the oven dry weight basis. This was accomplished by cutting the sticks into one inch blocks numbering the blocks and recording the numbers. Immediately on doing this the wet weight of each block was obtained on the torsion balance and the weights properly recorded. The blocks were placed in the Freas electric oven for 48 hours at 100 degrees C., weighed again at the end of this time, and the weights properly recorded. The moisture per cent contents of each block was computed by the means of the following formula:

$$\frac{W - D \times 100}{D}$$

Where W = the wet weight of the wood as removed from the jar and D = the oven dry weight of wood after 48 hours in the Freas electric oven at 100 degrees C. The moisture contents of the separate blocks of both the inoculated and the control test pieces were obtained in this manner for the different species. The results were entered in the form provided.

Discussion

This investigation was made with the objective of obtaining information on some of the fundamental factors which make it possible for blue staining organisms to develop in the sapwood of certain commercial timber species. It will be necessary to discuss these factors before practical control measures can be applied. Much more work will be necessary before definite conclusions can be drawn. However, the results of these preliminary tests are indicative of certain conditions favorable or unfavorable to the development of these fungi. In these tests only the upper point of maximum growth and upper point of inhibition of growth in relation to the moisture content (per cent of moisture in relation to oven dry weight basis) could be obtained. A method for controlling the moisture content must be devised for determining the minimum moisture content that would support growth, and to determine the lower moisture point at which growth was inhibited. It is probable that more uniform results would be obtained if each species of sapwood was inoculated with a blue stain organism which had grown in that particular species, and had later been isolated from it. This was the situation in the case of **Tilia glabra** inoculated with blue stain collected from the sapwood of **Liquidambar stryaciflua.** The growth of the organism was retarded by the uneven temperature of the room in which the experiment was conducted. The temperature would fall each night as the heat was turned off each evening. This factor would have no effect, however, on the comparative results obtained.

The relation of the density of wood to the moisture content (expressed in per cent of water in relation to oven dry weight) favorable or unfavorable to the growth of the blue stain organisms was brought out rather vividly. The results show (Table 1) that the greater the density the less is the moisture content required at the point of maximum growth and at the point of inhibition of growth. This is explained in that the denser woods have thicker and heavier cell walls and smaller lumina and intercellular spaces. Even though there was present in the dense wood the same weight of water per unit of volume as compared to a less dense wood, the moisture per cent would be less. Also there must be present a certain amount of air for the best growth of these fungi. This would necessarily reduce the moisture content required for the inhibition and upper limit of growth in the case of the denser wood.

The data show (Table 1) that the inhibition point of growth for the fungi contained a higher moisture content than for the point maximum growth, by a range of eight to forty-six per cent of moisture content (oven dry weight basis). The average was twenty-five per cent of moisture content higher than the point of upper maximum growth. The moisture content at the point of inhibition of growth of these stain fungi is considerably higher in these tests than the moisture content of the green sapwood. For example, the moisture content of green sapwood of Pinus ponderosa is 157 per cent.[1] The average moiserable growth was 190 per cent (Table 1). Roth, in Timber Bulletin 10, U. S. Division of Forestry, gives 150 per cent of moisture content for the sapwood of green **Tilia glabra.** The staining fungus was able to grow when the moisture content was 220 per cent (Table 1). The relation, no doubt, holds for the other species.

Pinus monticola suffered a greater degree of staining than any of the species tested. The time required to reach a given degree of staining was less in the case of **Pinus monticola** than any of the species tested. The other species in the experiment had only a surface growth of the blue stain organism. On the other hand, **Pinus monticola** sapwood was stained to a depth of from 1-64 to 3-64 of an inch. This indicates that this species is very susceptible to attack and injury by the particular fungus used in the tests.

The experiments brought out the fact that frequent irregularities occur in the distribution of moisture content in a sapwood stick which has been placed with one end in water. This was especially true in the case of **Pinus ponderosa.** The fact that there was only surface discoloration of the test pieces except in **Pinus monticola** indicates that the moisture content of the inner portion of the wood just below the surface was too high for the penetration of the organisms.

Munch, in working with the sapwood of Scotch pine, found that there was no penetration and staining by the fungus (**Ceratostomella coerulea**) at 143 per cent of water above oven dry weight of wood, and at from 119 per cent to 78 per cent of moisture con-

1. Determined by E. E. Hubert. This is an average of twenty samples of *Pinus ponderosa* collected from the Boise region.

ture content of the test sticks for any consid-

tent there was little penetration and staining. He found that the optimum moisture per cent for growth ranged from 79 to 33 per cent of moisture content. Below 28 per cent there was very little staining of the wood.

The staining of **Pinus monticola** to a depth of 1-64 to 3-64 of an inch may be due to the fact that there was a lower moisture content in the outer layer of wood than would be indicated by the average figures of the moisture content of the block. The per cent of moisture certainly must have been very much higher than that of Scotch pine as determined by Munch.

Summary

Under the particular conditions affecting this study and for the species used, the following is a summary of the results obtained.

1. The moisture content (per cent of oven dry weight of wood) of sapwood favorable or unfavorable for the growth of blue stain **Ceratostomellea sp.** bears an inverse ratio to its density (Table 1).

2. The maximum moisture content at the points on the sticks where growth of the blue stain fungi was inhibited was found to be considerably higher than the points at which any considerable growth of the fungi took place.

3. The moisture contents inhibiting growth of blue stain fungi in the sapwood of the species tested is considerably higher than the moisture contents of the green sapwood at the time of felling.

4. **Pinus monticola** at the high moisture contents used offers less resistance to the invasion of blue stain **Ceratostomella sp.** than any species used in the tests.

List of Citations

1. Hubert, E. E. The Sap Stain Problem and a Ten Million Dollar Loss, Southern Lumberman, Feb. 16, 1924, 114:47-48.
2. Roth, F. Timber Bulletin 10, U. S. Division of Forestry, p. 31.
3. Snell, Walter H. Relation of Moisture Contents of Wood to Its Decay. Reprint from Paper, May 4, 1921.
4. Munch, E. Naturwissenschaftliche, Zeitschrift fur Forst. und Landwirtschaft, VII, 54.

OUR ALUMNI

By EDWIN C. RETTIG '29

A toast delivered at the Annual Banquet of the Associated Foresters, March 7, 1928

(Mr. Rettig is an ideal example of the successful alumnus. Immediately upon graduating he associated himself with the Clearwater Timber Company, where, by his ability and industry, he has steadily advanced till he now occupies an influential position in the company affairs.—Ed.)

Your committee has asked that I say a few good words for the alumni. After scratching a few cobwebs away, I have taken as my topic what I consider the relationship and usefulness of the alumni to their Alma Mater, their undergraduate brethren, and to their country.

If I had the power to fathom the innermost thoughts of the undergraduates I am sure any number of them would be saying to themselves, "Of what use or benefit are the alumni to us? They are just some has beens, spent four years at the university, probably flunked trig or chemistry the same as the rest of us, and now come back and try to pull the wool over our eyes with their tales of fictitious success."

I thoroughly agree as to the wool business, but I do hope I can convince you that your success in at least a small way is due to the success and accomplishments of the alumni and that you in turn will be responsible for the success of the students and graduates who are to follow.

The alumni, by their success, do far more to advertise their Alma Mater than any other medium. In my opinion, Yale and Michigan have achieved their success through their alumni, and not through advertising and their curricula. The former graduates have given such prestige to their schools that we are inclined to hold a Yale or Michigan man in awe, and feel that he is a step ahead of us.

However, as our school grows older and our alumni have had a chance to cope with the obstacles confronting them and have made good progress, they will in turn establish prestige for Idaho. Through this medium, they should bear close relationship to their school, as upon their success depends the success of the University, and through the same medium they have established their usefulness to the school.

Because of the now established prestige of the school, I am inclined to think that the students upon graduation will be farther ahead and much more in demand in their struggle for success than the early graduates. I can remember when both graduates and undergraduates had considerable trouble in finding employment. The Forest Service, which now employs a large number of our graduates, at that time thought very little of Idaho men, due to the fact that the school was in its infancy and the Forest Service wanted men from well established schools with more prestige. Neither did private forestry at that time present a very wide or attractive field, hence the lumber companies did not call for many trained foresters. I might state that the Potlatch Lumber Company did place a few of the best of the early crop of foresters and also helped quite a number of others through school by giving them employment during the summer months, and in many ways helped materially in nursing the infant school to its present growth.

I have often heard Professor I. W. Cook, now of the University of Montana, but formerly of Idaho, say that during the early years of the School of Forestry Dean Shattuck and he heaved a great sigh of relief if they succeeded in placing three-fourths of all of the students in forestry work when fifteen or twenty students constituted the forestry School. Today, with its increased enrollment, I do not believe I am far wrong in stating that Dean Miller has far less trouble in placing his hundred men than Dean Shattuck his fifteen or twenty.

This change has come about through the prestige of the School and the combined efforts of all foresters who have now conclusively established a demand and market for their labors. With the many and varied problems confronting the lumber companies of today, trained men are becoming a necessity for the future well being of the industry. Certainly the alumni should be given some credit for the advancement of forestry and the demand they have partially created for forestry graduates.

Last, but not least, I desire to say a few words relative to the relationship of forest-

ers and forestry to our country. I was allotted only ten minutes for my toast, hence I shall be brief on this most vital point. Had it not been for the greatest forester of all time, who planted our trees in the beginning, America might still be undiscovered, as Columbus did not sail to America in a big steel ocean liner, and had it not been for our American forests he might not have reached his home to tell his story as I believe he made new spars for some of his vessels while visiting near our shores.

Forests again played a very important part in the settlement and development of our country and even today it is helping to provide an education for all, build good roads, make municipal improvements, furnish outdoor recreation, extend the railroads, furnish employment to millions of people, act as a reservoir for water which irrigates millions of acres of land, and last, but not least, the forests provide the material for the homes of the great majority of people.

Foresters have many problems to solve that are of nation-wide importance. Such matters as sustained yield, flood control, water shed protection, range management, tree diseases, insect depredations, fire protection, and forest taxation are problems of national interest that foresters must help to solve.

As a closing remark and thought to leave with you, I am wondering if there is not a relationship between the increase in the number of technical foresters and the decrease in the forested area.

IDAHO FOREST EXPERIMENT STATION

(Continued from Page 13)

done in the way of research calculated to safeguard these resources. There are few large industrial concerns today in other lines that do not maintain well organized research departments. American agriculture owes its world leadership to the research which the agricultural experiment stations have made possible.

Forest experiment stations abroad have been established generally in the last half century, and they are already giving the countries maintaining them a sound forestry practice. The United States is only now getting this phase of the forestry program under way. Eleven government forest experiment stations are now established in different sections of the country. But federal effort must be supplemented by that of other agencies, and of the latter none are better calculated to take the lead than the forest schools. A few schools have already established forest experiment stations, notably Yale, Harvard, and Minnesota, hence the recent action of the University of Idaho in creating the Idaho Forest Experiment Station is timely and in line with the trend. Its work is a large one, as the problems pressing for solution are many and important.

Current Projects

The Forest Experiment Station starts out with an initial program consisting of some thirty projects, the most of them taken over from the School of Forestry. Among the more important of these are: Studies of Inland Empire Ribes in relations to blister rust control (under way two years); forest management as a method of blister rust control; a study of the efficiency of chemical end coatings of logs left in the woods or stored; the cause and prevention of sap stain in lumber; studies on the decay resistance (durability) of native woods; studies on the toxicity of the water soluble extractives and on the effect of kiln drying on the durability of **Pinus ponderosa** heartwood and sapwood; studies of the rots found in wood products, such as sash, doors, screen frames, etc.; utilization of little used species; factors influencing the movement of moisture in wood; the diagnostic characteristics of the woods of the species of the genus Abies; studies in the rate of growth and future yields of western white pine which has come in on old burns in northern Idaho (under way four years); the effect of logging on the growth and form of residual species in the western white pine type of Idaho (under way four years); the effect of logging on the growth and form of residual western red cedar in northern Idaho; basic studies for empirical yield tables and for determining the marginal diameter limit for cutting; studies in rate of growth and yield of residual western yellow pine; a study to determine the influence of windbreaks on the growth and yield of farm and orchard crops.

CO-OPERATIVE WORK WITH THE STATE DEPARTMENT OF VOCATIONAL EDUCATION

During the past year, the School of Forestry has again entered the field of extension education in the lumber mills. In co-operation with the State Department of Vocational Education, the School has given direct aid in conducting a certain number of the classes held at lumber mills in the Idaho region.

Classes in seasoning of lumber and in the properties and uses of wood were conducted at the Edward Rutledge Timber Company's mill at Coeur d'Alene. Instruction on these subjects and on the problems of sap stain and decay was given the millmen by Dr. E. E. Hubert, of the School staff. Similar work was carried on at the Clearwater Timber Company's mill at Lewiston by Dr. Hubert. A complete course in seasoning and in the properties and uses of wod was given. The results were very gratifying and keen interest was shown in the discussion of the principal mill problems dealing with the seasoning of wood and the prevention of defects. As many as fifty employees were assembled at some of these classes.

A series of talks on stain and decay defects was given by Dr. Hubert before the class in scaling held at Potlatch, Idaho, in November, 1927. This course was attended by scalers from various lumber companies, from the Forest Service, and from the Northern Pacific Railway. The course was in direct charge of C. E. Knouf, who is head scaler for the Weyerhaeuser companies. The scaling course, as well as the other courses mentioned were all organized by Mr. N. B. Giles, Supervisor of Vocational Education.

TWENTY-FIFTH YEAR IN FORESTRY FOR DEAN MILLER

The Rocky Mountain Section of the Society of American Foresters fittingly celebrated the completion of twenty-five successful years which Dean F. G. Miller has so unstintingly given to the profession, by gathering at a surprise banquet at the Elk's temple in Moscow to commemorate this silver anniversary.

The State Commissioner of Education, W. D. Vincent, was toastmaster and among the able speakers were found Ben E Bush, Idaho State Forester; W. D. Humiston, Assistant General Manager of the Potlatch Lumber Company; Stanley A. Easton of Kellogg, one of the University Regents; Melvin Bradner, Missoula, Assistant District Forester in charge of Forest Products; and Arlie Decker, '13, Potlatch Lumber Company. Dr. E. E. Hubert presented the Dean with a scrap book containing congratulatory letters and telegrams received from foresters from all parts of the country many of whom were Dean Miller's classmates at Yale. Generous praise was given the honor guest for his good work as a forester, educator, and scholar during his twenty-five years of active service to the profession.

In the course of the after dinner speaking, it was disclosed that Dean Miller received his degree of Master of Forestry from Yale in 1903, after having received his B. Ph. degree from the State University of Iowa in 1900, and his B. S. in Agriculture from Iowa State College in 1901. He was made Professor of Forestry at the University of Nebraska in 1903, directly after his graduation and remained at that institution until 1907 when the cal of the west became too strong for him and he accepted the Deanship of the School of Forestry at the University of Washington at Seattle, where he remained until 1912. He then left his chosen profession for a short time to reenter it in 1915 as Professor and Head of the Department of Forestry at Washington State College at Pullman, where he remained until 1917, in which year he accepted the Deanship of the School of Forestry at the University of Idaho.

After the formal addresses were given, the Dean was called upon to say a few words and his usual wit was found to be up to the occasion when he remarked that "Like the time Bre'r Rabbit fell into the honey, it will take me a long time to lick this all off".

Dean Miller, however, has made for himself an enviable reputation among foresters, worthy of emulation by men desiring to advance and do the best for their chosen profession. He is now widely known throughout the United States and his honest efforts have placed his pride, the School of Forestry of the Uni-

versity of Idaho, among the recognized leaders of American forestry education.

The alumni present at the banquet were as follows:

Arlie D. Decker, '13	Arthur M. Sowder, '27
Walter D. Fields, '26	Arlie W .Toole, '27
Edwin C. Rettig, '19	Fairly W. Wa rath, '27

Harold Z. White, '26

QUALITIES REQUIRED BY FOREST SERVICE

(Continued from Page 17)

you can figure out for yourself problems on the ground and know where to go to find the answers to innumerable questions which will come up to you in every varying form. I agree absolutely with a statement which Dean Miller once made to me in reply to a question which I asked him when he said "We bend every effort to teaching **forestry"**. Remember that statement whether you get the full import of it now or not. As the years go by I believe it will mean a lot to you.

Another thing which the Forest Service wants you to have is an appreciation of the fact that when you finish school it is commencement for you. Once in a while we get a lad who figures that when he has finished school he has learned forestry; that he knows enough about it so that he can quit studying. Such, of course, is never the case. It is an old saw that never stands still; one must either go ahead or backward. To be successful it is necessary to keep studying to keep up with the procession. I would therefore put down as one of the qualities, the willingness to study, to specialize and the courage to continue. Another thing that ties in very closely with this same idea and a thing that the Service wants on the part of the men who come from the forest schools is a realization that the "old timer" in the Service has a lot to give you and is perfectly willing to trade his experience gained in the field for your experience gained in the class room. I have yet to find the old timer who is not perfectly willing to give all the help which he possibly can to the man from school who lets him know that he wants his help and who also lets him know that he does not believe that he knows it all.

Another quality which the Forest Service wants in its men is initiative. It wants independence of thought; the willingness to take a chance and go ahead on new work. Mistakes are expected; use your very best careful judgment, surely, but go ahead and try things out. Try hard not to make the same mistake twice but for goodness sake go ahead and do something.

In our game as well as in any other it is necessary, of course, to accept responsibility for your acts and work. We want you to stand squarely on your own feet; we do not want you to hedge or cover.

We want you to have a pride in your profession as well as a pride in yourself. Time was when it was not uncommon to caution the men assigned to the Forest Service from the forest school to forget as quickly as they could the things they had learned in school. That was many years ago. It is not the case any more. We have come to the understanding that forestry as a profession is just as much a profession to be proud of as any other profession, that forestry is just as vital to the welfare of humanity as law or medicine or architecture. And so I say we do not want self-pity, but we do want you to have pride in yourself and pride in your profession. I expect you know now the reason why I said in the beginning that the qualities which the Forest Service require in its men are the same as those that any other employer requires in his men.

OUR STATE FOREST LANDS

(Continued from Page 6)

sawmills, we shall see the country dotted with chemical plants and other industries and the resulting flow of outside money will add immeasurably to our prosperity.

Idaho's timber is the greatest factor in the ultimate general prosperity of the state and the great resource behind penal, charitable and educational institutions. We are not going to let it burn nor will we permit its ruthless exploitation.

Idaho put no restrictions on methods of cutting timber in state sales prior to 1919 but at that time the State Board of Land Commissioners established the policy of selling timber with certain reservations. The principal feature of this policy was reserving the immature trees on sale areas and requiring purchaser to pile and burn the brush in such a way as not to fire kill the young timber remaining. In no case now will the state include in a sale any pine under fourteen inches in diameter or any cedar poles under twelve inches in diameter, these two being of chief

value for deforesting, and all sizes of other species of timber are allowed to be cut. However, in the case of the other species there is a large number of trees left which are thoroughly protected by having the brush carefully disposed of. We have found that this leaves a nice stand of immature timber after the merchantable trees have been removed, and in some cases there will be an-

hemlock to be removed by the operator, sometimes at a loss.

Some of the private operators are also making certain reservations in their cuttings on their own lands.

In the adoption of this policy in 1919 by the State quite a number of the operators objected to these restrictions, but at the pres-

When Idaho became a state, the Federal

Sales of State Timber by Counties from 1891 to 1919 and from 1919 to 1928

COUNTY	1891 to 1919 Acres	1891 to 1919 Amount	1919 to 1928* Acres	1919 to 1928* Amount
Adams	520.00	$ 16,597.00	80.00	$ 5,780.00
Bannock			160.00	120.00
Benewah	280.00	6,051.50	2,739.94	99,373.75
Blaine			40.00	
Boise	45,703.90	295,313.01	1,328.13	16,777.00
Bonner	14,255.87	247,276.30	17,564.24	1,083,049.97
Boundary			2,320.00	64,866.25
Clearwater	1,467.75	45,388.00	12,108.00	845,537.75
Fremont			480.00	4,253.00
Idaho	490.80	8,045.40	520.00	11,500.00
Kootenai	43,725.88	461,181.47	4,444.42	128,012.50
Latah	51,672.08	310,438.30	480.00	8,395.00
Lewis	520.00	1,900.00		
Nez Perce	4,520.81	7,423.25		
Shoshone	36,625.23	178,538.75	4,857.50	211,951.25
Valley	3,160.00	21,083.00	5,453.33	38,173.85
Washington	1,229.87	20,105.00		
TOTALS	204,172.19	$1,619,340.48	53,695.56	$2,517,940.32

*The period from 1918 to 1928 includes the period up to May 1, 1928.

Recapitulation of Timber Sales—1891-1928

Sales by Periods	Acres	Amount
Total Timber Sales 1891-1919 (28 Years)	204,172.19	$1,619,340.48
Total Timber Sales 1919-1928 (9 Years)	53,695.56	2,517,940.32
Grand Total 1891-1928 (37 Years)	257,867.75	$4,137,280.80

other commercial crop in from thirty to fifty years.

In all timber sales the state reserves the lands with the immature growth and requires the purchaser to remove the timber purchased by him in a specified time, after which the lands revert to the state in an ideal condition for reforesting.

The United States Forest Service is going even further in this matter than the State of Idaho and is emphasizing the growing of white pine to the extent of requiring all inferior species in the way of larch, fir, and

Government made certain grants of land. Among these were two designated sections in each township for the common schools, providing title had not already passed. This ent time we are getting excellent results.

Th following tables show the timber sold by the state prior to 1919, before the present methods were adopted, and the sale of timber since their adoption.

amounts in round numbers to three million acres. In addition to this certain grants for other institutions were also made. The following table shows the acres by grants:

	Grant Acres
Scientific School	100,000
Public Buildings	32,000
Normal School	100,000
Agricultural College	90,000
Charitable Institutions	150,000
Insane Asylum	50,000
Penitentiary	50,000
University (State)	50,000
Public School	2,873,241
TOTAL	3,495,241

THE BLISTER RUST SITUATION

(Continued from Page 15)

od of forest management adopted by the owner of the timberland would be a determining factor in his decision to apply control measures. An owner who is cutting everything merchantable with no intention of returning for a second crop and who has but a ten year cut of mature timber ahead of him cannot be expected to invest money in blister rust control. That he will have to suffer some loss is inevitable, the extent of damage depending upon a number of factors. On the other hand an area representing several year's cut and where continuous production of white pine timber is the goal cannot be neglected —control measures must be applied if the white pine is to be grown permanently.

Local control, which is based upon the inability of the rust to spread from Ribes to pine for more than a relatively short distance, was developed in the eastern part of the United States. It has been in use there sufficiently long to justify its adoption. In the eastern states over 800,000 acres are annually being placed under protection by this method and during the past ten years more than six million acres of white pine land have been cleared of Ribes. The method consists of the removal by pulling or by the use of chemical sprays of the Ribes growing within 900 feet of pine stands. In more open pine stands a second removal is necessary in the sixth or seventh year following the first. Where the stands are dense, the first removal of Ribes suffices for a much longer period and in many cases needs no further eradication until fire and logging change the nature of the stand and cause the return of the currants and gooseberries.

The plan of applying this method in the Inland Empire region as outlined by the Spokane office of Blister Rust control includes the following steps:

1. Ribes eradication and re-eradication in the stream type before heavy damage results.
2. Ribes eradication in those reproduction stands which will suffer damage before Ribes are naturally eliminated by dense forest growth.
3. Ribes eradication in maturing stands that are in danger of serious damage.

It is beleved that the stream type represents our greatest rust hazard in Idaho and, therefore, needs our immediate attention. That sugar pine regions differing greatly from the north Idaho areas, cannot be handled under such a plan is obvious and methods of attack to meet the local conditions must be developed.

As I see it, the problem of control is of such a magnitude and involves such a complexity of factors that nothing but a uniform control plan applied to the entire white pine area as a unit can ever bring about the measure of control that is essential for protection. As a part of such a plan, there is every reason to believe that proper methods of forest management will plan an important part in the successful control of white pine blister rust.

What the Boys Will Be Doing

Anderson, Bernard A. "Andy" will be with the Blister Rust this summer. His address is 618 Realty Building, Spokane, Washington.

Axtell, Donald H. Ecology experimental work for the Blister Rust. 618 Realty Building, Spokane, Washington.

Balch, A. Prentice. Blister Rust reconnaissance. 618 Realty Building, Spokane, Washington.

Beckwith, Samuel C. Mountain Home, Idaho c-o R. W. Beckwith.

Biker, John B. c-o Harry C. McAllister, Wallace, Idaho.

Brown, Harold G. Trail crew, Kaniksu National Forest, Port Townsend, Wn.

Buchanan, T. Stewart. Blister Rust. Plant Pathology Office, New Post Office Building, Portland, Oregon.

Burton, C. Leslie. Lookout, Idaho National Forest, South Fork Ranger Station, McCall, Idaho.

Connaughton, Charles A. Cruising on Boise

(Continued on Page 60)

THE FORESTERS' EXHIBIT

THORNTON G. TAYLOR
Assistant Professor of Forestry

The Foresters' Exhibit was one of the outstanding and most popular displays shown on Engineers' Day, which was held this year on May 4. The combined displays of the foresters, engineers, and miners drew a particularly large and interested crowd for the second occurrence of this biennial affair.

The foresters' exhibits were located on the grounds just east of the U-Hut and inside the U-Hut. Of our many exhibits, one which attracted a great deal of attention was the Model Forest. A miniature forest area was laid out on which was shown different age classes of timber, a burn, a newly cut-over area showing brush piling, a lookout cabin, a trail, a ranger station and pasture, a lake, a high lead unit, a dam and a flume. To add to its attractiveness, water was furnished so that the streams might appear natural and so that the flume might be seen in operation.

Model Forest

Two contests were arranged on the grounds of the U-Hut—the log sawing and log chopping contests. These exhibitions of speed and skill drew a large number of interested spectators. Prizes for both contests were furnished, the saws for the log sawing contest being donated by the Simmonds Saw and Steel Company of Spokane, while a four-pound axe was given to the winner of the log chopping contest by Collins and Orland of Moscow.

The Pacific Marine Fire Pump was one of the champion noise makers of the whole show, running the stamp mill a close second. The remainder of the outside exhibits included an Osborne fire finder, a smoke chaser's equipment and fire dispatchers map, a cruiser's tent and equipment and a real Missouri encumbrance, which the boys packed up and on which they displayed their skill in "throwing the diamond".

The exhibits inside the U-Hut were also varied and of general appeal. A transparency backed by electric lights depicted an exceptionally real interpretation of a forest fire.

There was a guessing contest as to the age of a section of white pine trunk, in which 534 people participated. Silk hose were given by Davids of Moscow for the man and woman guessing the correct age. The guesses ranged from 10 to 6754 years. The exact age was 235 years and this was the age given in two guesses.

Several exhibits as wood technology, forest products, and dendrology were grouped together. Here the log men could observe through a demonstration microscope the structure of wood. The Potlatch and Standard Lumber Companies furnished specimens of their various products and here also we find the lignun vitae and balsam wood for the spectators to lift and exclaim over. Representative samples of Idaho conifers, framed and showing twig specimens, seeds, fruit, and pictures of the general appearance of these trees in the woods were found. Jeff, the digger pine cone, and Mutt the redwood cone were also on display.

Many of our visitors were interested in finding out how tree measurements were taken and the general processes of map making. The mensuration exhibit, therefore, had several trees painted on a long strip of paper tacked to a wall and methods of obtaining heights were demonstrated. The various instruments used in cruising and mapping were displayed and the use of some of them shown through the medium of a log.

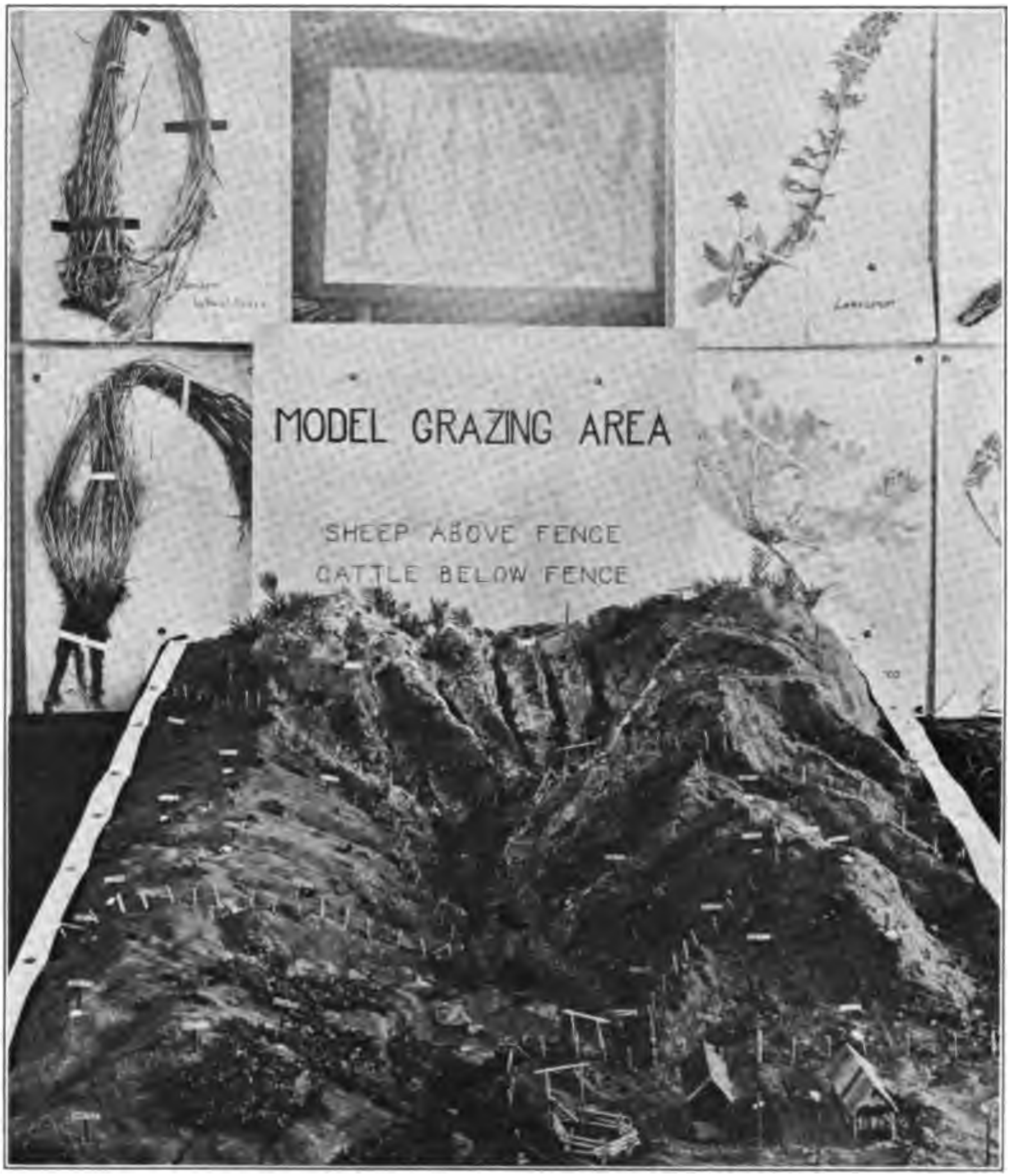
The blister rust display made up of beautifully colored enlargements and preserved specimens brought home to the visitors the importance of protecting our forests from the dread ravages of the white pine blister rust. One of the features of this display was a model forest in a bottle constructed by and loaned through the kindness of Ranger Daughs of Princeton.

The last of the displays was the range management exhibit. Here, we find a Model Grazing Area constructed from clay showing one sheep and one cattle allotment and other necessary features included. Flanking this miniature grazing area were displays showing on one side a few of the plants poisonous to livestock and on the other side important forage grasses.

All the various exhibits were explained and questions were answered on all forestry subjects. It may be seen that a good deal of work and material were necessary to make these displays a success, and credit should be given to the student body of the Forest School and our friends who furnished a large amount of the exhibit material.

ASSOCIATED FORESTERS ELECT

At the last meeting of the year, May 17, the Associated Foresters elected officers for the ensuing year as follows: Fred H. Kennedy, Dubois, Idaho, president; William T. Krummes, Boise, Idaho, vice-president; George V. Hjort, Kooskia, Idaho, secretary-treasurer; and Howard J. Sargeant, Granger, Washington, publicity agent.



Ranger Management Exhibit at Engineers' Show

Foresters, A Cosmopolitan Group

The student body of the School of Forestry is notable for its geographical distribution. Fwenty-one states and three foreign countries are represented in the enrollment for the year of 1927 and 1928. Thirty-nine are from Idaho, twenty-two from Washington, eight from California, seven from Illinois, five from Canada, four from Oregon four from New York, three from Montana, and and three from Ohio.

Other states and countries represented by one or two students are: Delaware, Iowa, Kansas, Minnesota, New Jersey, North Dakota, Pennsylvania, Rhode Island, Texas, Utah, Wisconsin, Colorado, Wyoming, Philippine Islands and Russia.

AMERICAN FORESTERS MEET AT UNIVERSITY

A. M. SOWDER, '27
Extension Forester for Idaho

The Northern Rocky Mountain Section of the Society of American Foresters held its first Moscow meeting in Morrill Hall, University of Idaho, March 10, 1928. The meeting was called to order by Dean F. G. Miller, of the Idaho School of Forestry, who welcomed the members and guests to the University, and introduced Mr. Wilfred W. White, U. S. Forest Service, Missoula, Montana, who presided. The committee in charge of the meeting consisted of Dean F. G. Miller, Chairman; C. K. McHarg, and A. A. Segersten.

There were present at the meeting seven lumbermen, fifteen members of the U. S. Forest Service, including representatives from the Selway, Idaho, St. Joe, and Clearwater National Forests, and from the Missoula and Ogden Offices, seven from the Forest School faculty, five from the Office of Blister Rust Control at Spokane, the State Forester and two assistants, and twenty-seven forestry students from Idaho and W. S. C., making a total of sixty-four.

The first paper on the program was entitled "Blister Rust and Its Relation to Forest Management", by Dr. E. E. Hubert of the Idaho School of Forestry.

Mr. C. C. Strong, Assistant Forester, Office of White Pine Blister Rust Control, Spokane, read a paper on "The Application of Blister Rust Control in the Inland Empire".

The third paper on the afternoon program was by Mr. W. W. White, the subject being "Is White Pine Essential to Forestry in the Inland Empire". A general discussion followed the reading of each paper.

Mr. Strong then showed a series of lantern slides pertaining to white pine blister rust.

A dinner was held at the Moscow Hotel at 6:00 P. M., with an attendance of thirty. Entertainment was furnished by the University of Idaho male quartet.

Evening Session: Meeting called to order by Chairman W. W. White at Dean F. G. Miller's home, Moscow, 8:00 P. M. Thirty-five were present.

Motion made, seconded, and passed that a committee of three be elected to arrange for similar meetings for the coming year. The following were chosen as the committee: E. E. Hubert, C. K. McHarg and Jesse L. Bedwell.

Chairman White introduced Mr. W. D. Humiston, of the Potlatch Lumber Company as the first speaker of the evening. His paper was entitled "Utilization of Wood Waste—The Need". This is published elsewhere in this issue.

The subject of the second paper for the evening session was "Possibilities in the Reduction and Utilization of Wood Waste", by Melvin Bradner, which in his absence, was read by E. G. Wiesehuegel.

Harry I. Nettleton, of the Idaho Forest School faculty, then gave a progress report on the "Importance and Value of White Pine Residual Stands".

A lively discussion followed the reading of these three papers, participated in by R. H. Rutledge, E. E. Hubert, E. H. Myrick, A. D. Decker, Roy A. Phillips, and others, at the conclusion of which Mrs. Miller served refreshments.

XI SIGMA PI

WALLACE M. SALING, '28

Xi Sigma Pi, national honorary fraternity, was organized as a local society at the University of Washington in 1908. The objects of the fraternity are to secure and maintain a high standard of scholarship in forest education, to work for the up-building of the profession of forestry and to promote fraternal relations among earnest workers engaged in forest activities.

A new constitution with a broader field was drawn up in 1915 and the fraternity became a national organization. Since 1915 eight other chapters have been installed at prominent forest schools throughout the United States. These are Alpha chapter, University of Washington, Seattle, Washington, 1908; Beta chapter, Michigan Agricultural College, East Lansing, Michigan, 1916; Gamma chapter, Univer-

sity of Maine, Orono, Maine, 1917; Delta chapter, University of Minnesota, St. Paul, Minnesota, 1920; Epsilon chapter, University of Idaho, Moscow, Idaho, 1920; Zeta chapter, Oregon Agricultural College, Corvallis, Oregon, 1921; Eta chapter, Pennsylvania State College, State College, Pennsylvania, 1924; Theta chapter, University of California, Berkeley, California, 1925; and Iota chapter, Pennsylvania State Forest School, Mont Alto, Pennsylvania, 1927. The Epsilon chapter, Idaho, started with a membership of seven, two members of the factulty and five students. The increase in interest has been growing and the members are aggressively active.

To be eligible for membership in Xi Sigma Pi, a student must have completed two and one-half years of standard college work in an approved school of forestry. Three-fourths of his grades shall have been above 80%, and he shall have received no failures in forestry subjects. He shall also have shown creditable interest and activity in practical forestry work. Scholastic standing in forestry is not the only aim of the fraternity, as it wants to stimulate and increase the activities and interest of the undergraduates in all matters dealing with forestry.

Soon after its establishment the Idaho chapter of Xi Sigma Pi inaugurated a movement to stimulate scholarship in forestry education. As a result, the chapter purchased an attractively designed bronze tablet, upon which are engraved each year the names of the students attaining the highest average in each class for the year. This tablet is placed on the walls of the main floor of the Administration building, and the honor of having one's name upon it acts as a beacon throughout the four years.

Those students who have so far reached the goal are as follows:

1922—James W. Farrel, senior; Russell M. Parsons, junior; Arthur M. Sowder, sophomore; Paul M. Harlan, freshman.

1923—Albert S. Daniels, senior; Ralph S. Space, junior; Paul M. Harlan, sophomore; Floyd W. Godden, freshman.

1924—Rogers G. Wheaton, senior; Robert P. McLaughlin, junior; Floyd W. Godden, sophomore; Henry C. Hoffman, freshman.

1925—Ralph S. Space, senior; Warren H. Bolles, junior; Galen W. Pike, sephomore; William W. Mitchell, freshman.

1926—Warren H. Bolles, senior; Galen W. Pike, junior; Charles A. Connaughton, sophomore; George J. Illichevsky, freshman.

1927—Arlie W. Toole, senior; Charles A. Connaughton, junior; George J. Illichevsky, sophomore; William T. Krummes, freshman.

When prominent foresters visit the campus it has been the custom of the fraternity to have a luncheon followed by informal talks. This has not only served to get the men together in a social way, but they have always been given a message full of helpful pointers on matters of forestry.

The officers of Epsilon chapter for the past year just closing are: Wallace M. Saling, Forester; Charles A. Connaughton, Associate Forester; Allan R. Cochran, Secretary-Fiscal Agent; and William W. Mitchell, Ranger.

Members and Pledges of Xi Sigma Pi

The new pledges this year are George J. Illichevsky, '28; Prentice Balch, '29; E. Gordon Ellis, '28; Robert Davis, '28; and Erwin G. Wiesehuegal, Instructor. The fellows appeared on the campus Wednesday morning, May 9th wearing their wood's clothes and pinned on the back of their shirts was a large Forest Service fire prevention sign. During the fore-noon they carried some appropriate forester's tool. They served an excellent feast to the members at noon, in the arboretum. Initiation was completed at four o'clock and every one journeyed to the Blue Bucket, at six, for the initiation banquet. A short business meeting after the banquet was very successful. Prentice Balch was elected forester and George J. Illichevsky, secretary-fiscal agent, for the coming year.

Associated Foresters, 1927-28

THE ASSOCIATED FORESTERS

By CHARLES A. GREGORY, '28, President

The evolution of our present day organizations had its beginning in early man who was a very primitive creature. He inhabited most of the favorable regions of the earth, and in his wanderings in search of food he rarely came in contact with others of his kind. His neighbors were few and far between and since the gregarious instinct was not highly developed, he operated largely as an individual and killed his own food, though it was a difficult and dangerous task. But he early realized, when population began to increase, that two or more individuals by co-operation could kill a beast with less danger and difficulty. So it was natural that he began to live with others to protect himself from his enemies.

The size of these groups increased with the population at first into tribes, later into societies, and now into nations. Thus it will be seen that it was not only due to the greater development of the gregarious instinct, but also to the interests which they had in common that brought about organization.

Aside from the obtainment of the necessities of life, they also began to provide for their entertainment. Those who enjoyed certain things in common naturally formed minor groups within the larger ones.

To this we may liken our organization, as being within the larger group, the University. We are one of the many organizations on the campus, each of which is the result of common interests among individuals. We, The Associated Foresters, are banded together primarily because we are interested in a profession common to us all—forestry, but if that were the only reason, the organization would not be justified. There are other reasons.

Of all the other organizations on the campus, we are perhaps the most cosmopolitan. We have a greater number of states represented as well as a greater geographical distribution. This is fortunate, since our profession is a national one and requires a knowledge of conditions not only in our own region but in others in order that we may keep in mind the scope of our problems. From these men who come from states other than our own we can become acquainted with the practices and conditions in regions unfamiliar to us.

The privilege of expressing our ideas to promote a closer fellowship and to offer constructive criticism is afforded us in meetings. We can then come in contact with the faculty which is willing to listen and assist in making our four year visit as smooth as possible.

But if we confined ourselves wholly to technical matters the purpose of this organization would in a large measure be defeated. To break the monotony of the routine class work, we hold programs among ourselves, prominent lumbermen and foresters are invited in to address us from time to time, and special events are staged on occasion.

SOCIETY

By C. N. TAYLOR, '30

First on the Club's social calendar, and outstanding in the social events of the University of Idaho, was the foresters' dance. This fall the foresters responded nobly, and turned out in full force to decorate. Extensive thinning was done in the arboretum and outlying woods and the trees therefrom were used to make a model forest of the gymnasium. The effect of artificial light on the hanging roof of the boughs and on the walls of standing trees, together with the scent of freshly cut fir, pine, and cedar was indeed very pleasing. An eight-piece orchestra was screened off in a sylvan glen, and a refreshment booth in another. Quite at home in the forest greenery, the foresters danced, and when tired sought out chairs hidden in the deep shade of evergreens.

Second on the Club's social calendar was the foresters' smoker. Finding themselves unable to live forever in the more or less dignified mien of the student, the foresters feel each year that they have to "let off steam", to let themselves go for once. Here is their big chance. Last winter the U-Hut was booked, mats and boxing gloves were provided, and everyone came with the idea of having a good time. They did! The seniors, juniors, sophomores, and freshmen put forth a play, each class endeavoring to out-do the other. Box-

ing and wrestling matches were fought with the usual "vim and gusto" of the forester. An unusual and very amusing event on the program was a boxing match on roller skates. Intermingled with the more strenuous events, musical selections on fiddle, banjo, mouth-organ, and sundry other instruments, were given by members of the Club. To cap the evening, hot-dogs, doughnuts, apples, and smokes were put out by the dozen. The concensus of opinion was that a smoker every week would not be unwelcome.

One of the most elaborate affairs staged by the Club was the annual banquet. The twelfth annual banquet of the Associated Foresters was held in the special "Varsity Banquet Room" of the Hotel Moscow, March 7, 1928. A fuller write-up of this affair appears elsewhere in these columns.

Another annual event is the foresters' barbecue. This is held early in the summer, a few weeks before the final examinations. The foresters are packed into cars and whisked away to the woods where they can shake off the atmosphere of books and can compete with each other in such arts as log-rolling, sawing, and axemanship. When the shadows begin to close, the gang gathers round the campfire and partakes of a feast, a true lumberman's meal which hits a weak spot in the human anatomy, a spot which hasn't been hit for nine long months.

This closes the social calendar of the Associated Foresters. These four major events, the dance, smoker, banquet, and barebcue, imprint themselves firmly in the minds of the members of the Club. To the graduates and alumni, these events bring fond memories of the years they spent at their alma mater; to the undergraduate, the happy thought that student life is decidedly not "all work and no play".

TWELFTH ANNUAL BANQUET

By HARRY I. NETTLETON
Instructor in Forestry

One hundred twelve members, alumni, and guests of the Associated Foresters attended the twelfth annual banquet held the evening of March 7 at the Hotel Moscow.

The problems ,responsibilities, and opportunities of the professional forester, the forest school and its graduates provided the key notes to a happy blend of instructive and mirth provoking series of after dinner addresses.

Mr. E. G. Wiesehuegel, of the Forest School faculty, presided as toastmaster. He introduced, as the first speaker of the evening, Mr. R. H. Rutledge, District Forester of District 4, United States Forest Service, Ogden, Utah. Mr. Rutledge spoke on "The New United States Forester", outlining some of the nationwide problems which will meet and test the new Chief Forester, Mr. Robert Y. Stuart, successor to W. B. Greeley. In addition to the flood problems of the Mississippi valley, Mr. Rutledge especially emphasized the three problems of timber taxation, public relations, and the handling of cut-over land.

Mr. L. F. Parsons, Executive Secretary and Comptroller of the University, outlined the responsibilities and opportunities of the Idaho Forest School in the recent establishment of the new Forest Experiment Station. Mr. Parsons pointed out that this station was established in recognition of past service by the school and of the importance of scientific forestry in the present day problems of the timber industry. The speaker stressed the fact that while mining, agriculture, and allied industries have fully recognized the importance of research in their development, the timber industry has but lately awakened to a like need within its own ranks, especially as regards closer utilization, new uses of wood, and the competition of substitutes.

In addition to this opportunity for service within the timber industry, Mr. Parsons emphasized the chance for closer co-operation with the State Forester in the solving of state problems, and with the Forest Service in its problems.

Reverend Marshall Wingfield, pastor of the Christian Church, added spice to the occasion by his opening and pungent comments on the previous speeches. He then spoke of his boyhood and foreign experiences in forests at home and abroad, stressing the influence of forests in developing unselfishness, courage, and strength of conviction in those who dwell in the open and silent places.

Mr. Earl David discussed the rapid development and use of rayon silk, which is a byproduct of spruce wood. He traced briefly the

rapid development of this industry, stating that it has already come to play a large part in the manufacture of clothing in this country. He added that this was only a hint of the possible by-products we shall shortly be deriving from wood.

Charles A. Gregory, president of the Associated Foresters, gave a snappy talk on the technical and social reasons for the development and existence of the Forest Club.

Mr. E. C. Rettig, of the Clearwater Timber Company, and an alumnus of the Idaho Forest School, outlined the part played by successful alumni in helping to develop and sustain the prestige of their Alma Mater and thus indirectly aid the later graduates in securing positions after leaving school.

General sidelights on the relationship of liberal arts and technology were given by Mr. Geoffrey Coope, instructor in English. Mr. Coope emphasized the importance of liberal arts as the basis for the present development of science, and pleaded for a closer co-operation between both branches of learning.

The last speaker, Mr. C. L. Billings, Assistant General Manager of the Clearwater Timber Company, gave some timely tips to prospective graduates as to opportunities open to them in helping to solve some of the present problems of the lumber industry. The speaker suggested that forest school men should not overlook opportunities to work with hand as well as brain and especially that they should uphold and defend the ideals fostered in their collegiate training.

Guests introduced by the toastmaster were: Ben E. Bush, State Forester; Arlie Toole, Deputy State Forester; Edwin G. Green, Moscow; Norman F. Gillham, Moscow; Jackson Space, Orofino; Adrian Nelson, Moscow; H. S. Tusler, Potlatch Lumber Company; Arlie D. Decker, Potlatch Lumber Company; A. A. Segersten, Potlatch Lumber Company; Harold Z. White, Clearwater Timber Company; Walter Fields, Clearwater Timber Company; Fairly J. Walrath, Clearwater Timber Company; R. L. Woesner, Potlatch Timber Protective Association; and E. H. Myrick, Supervisor of St. Joe National Forest.

THORNTON G. TAYLOR JOINS US

With the opening of the school year last September, Thornton G. Taylor joined the faculty of the School of Forestry, succeeding Clarence W. Watson, assistant professor of silviculture, who resigned to take up advanced work at the Yale Forest School, where he is now registered as a candidate for the doctorate degree in forestry.

Our New Professor

Mr. Taylor comes to the school with a good background in both training and practical experience. He did undergraduate work at the Massachusetts Agricultural College, and then entered the Yale Forest School, from which he graduated in 1921 with the degree of Master of Science in Forestry. Passing the examination for Forest Assistant, he accepted an appointment from the Forest Service and was assigned to District 4, where he served in various capacities till called to the University of Idaho as assistant professor of forestry.

SPECIAL LECTURERS

E. GORDON ELLIS, '28

The School was fortunate this year in securing the services of Mr. Gerhard Kempff, resident silviculturist of the Northern Rocky Mountain Forest Experiment Station, and Mr. R. H. Rutledge, District Forester, Ogden, Utah, each for a special course of lectures.

Mr. Kempff explained the purpose and work of the branch station at Priest River, and contrasted it with the Harvard Forest. He also compared forestry and forest conditions in the region of the Harvard Forest with those in the Selkirks of northern Idaho.

Mr. Kempff's discussion of the Priest River

branch of the Northern Rocky Mountain Forest Experiment Station was of special interest to the forestry students, since, through the courtesy of the Forest Service, they use this branch as one of their field stations.

Mr. Rutledge gave a very instructive series of lectures on forest economics, touching specifically such topics as range management, sustained forest industries, forest research, public relations work and the organization of the Forest Service. This was the first visit on the Idaho campus by Mr. Rutledge since he was a student here in 1895 and '96. The school sincerely hopes that his next visit will not be so long delayed.

Other Addresses

Besides the two series of lectures just mentioned, the Associated Foresters enjoyed addresses by other prominent visitors from time to time in the course of the year. Among these were Huntington Taylor, member of the board of regents and general manager of the Edward Rutledge Timber Company; George M. Cornwall, editor of the Timberman; Jesse L. Bedwell, '20, forest pathologist, Office of Blister Rust Control, Spokane; W. W. White, office of forest management, Forest Service, Missoula, Montana; and Russell N. Cunningham, '17, Forest Service, Missoula.

FIELD TRIPS

CHARLES F. FOX, '28

The Senior Trip to The Clearwater

On October 2, the senior class started on a two-weeks' trip to the logging operations of the Clearwater Timber Company near Pierce, Idaho. The Company has large holdings in this region, cutting for the immense new plant at Lewiston. White pine makes up the bulk of the cut; Douglas fir, cedar, white fir, larch, and yellow pine also being cut in small amounts.

In the Field

Nine seniors made the trip to Orofino by train, and there transferred to the logging train of "empties" being hauled back to the scene of operations. The class was quartered at Camp 5 for most of the time, later moving to Camp 3. The Company generously gave over the use of two large tents supplied with bunks and bedding, and meals were had with the loggers in the mess hall.

The work for the first week was under the supervision of Dean Miller and Mr. Nettleton. On Monday, the entire class made a general inspection of the logging areas and Forest School permanent sample plots. The

next day was given over to stem analysis studies of white pine trees recently felled. The data obtained were worked up later in the year by the senior mensuration class. On Wednesday, a residual strip survey was made of logged-off areas to determine the character and volume of cut-over stands, brush-burning damage, and loss by windfalls. Thursday was given over to sample plot reproduction studies, the class working in crews and covering logged-off areas in strips to determine the amount and character of reproduction.

On the next day three three-man crews laid out separate sample plots, carrying out the work as though the plots were for permanent study. Measurements and growth data were taken and used to develop yield tables in class. Saturday was given over to log-scaling in actual practice, check-scales being run by Mr. Nettleton and a Company scaler. Sunday was considered a "holiday in camp."

The work for the second week was supervised by Mr. Taylor and Mr. Wiesehuegel. Time studies for the various phases of the logging operations were made, thus affording a first hand study of the details that are a part of logging. The following operations were studied and timed, the data being noted on forms supplied: Felling and bucking, swamping and skidding, and power log-loading. The class checked specie and volume of logs handled by scaling each piece. Most of another day was given over to study of the larger trestles built for the main line of the logging railroad. Detailed sketches were made of these trestles.

A day and a half was taken up with the marking of timber, attention being focused on the silvicultural and economic basic for marking practice. Each tree received individual attention. The last day was spent in a study of brush piling and the construction of model piles. A diameter limit cutting study was made in conjunction with this.

On the following day the class returned to Moscow, after two weeks of "lumberjacking."

Spring Mensuration Trip

The work this year was conducted on a timbered area about two miles south of Potlatch, Idaho. Over the week-end of May 11-14, the mensuration class of ten men, headed by Mr. Nettleton worked on Section 24, Township 41 North, Range 5 West. Boundary control was run around the section and, working in two-man crews, a drainage and type map of the area was made in connection with a ten per cent cruise. The area was mostly a yellow pine type, but three other timber types were recognized and mapped.

Snake River Trip

Eight members of the native forage plants class left with Mr. Taylor on Thursday, May 17, for a three-day field trip up the Snake River. The trip to Lewiston was made by car. The class then boarded a boat and traveled by water for sixty-five miles up the Snake River to Divide Creek where camp was pitched.

The next two days were spent in plant identification, the collecting of specimens, and study of actual range conditions. The region is especially rich in plant material and is being extensively grazed. Consideration was given range management problems and attention was centered upon the types of forage being eaten by the sheep on the area.

Experiment Station Trip

On May 27, twenty juniors and seniors left with Dean Miller for a ten-day trip to the Northern Rocky Mountain Forest Experiment Station, returning on June 6. Most of the crowd made the journey by train.

The work was carried on under the instruction of Dean Miller and four Experiment Station officers, R. H. Weidman, H. T. Gisborne, Gerhard Kempff, and Robert Marshall. Much of the instruction and study was in the fields of silviculture, management, and mensuration. Protection and logging were also taken up. Instruction was mainly by actual performance of the job under intensive supervision.

Yield and thinning plots were studied, permanent plots laid out, and reproduction and fire studies made. The class visited nearby logging areas and studied timber sale practice. Brush piling, timber sale marking, and methods of working up data were covered by the studies.

Those making the trip to the Experiment Station were A. P. Balch, G. V. Hjort, G. J. Illichevsky, E. L. Keene, F. H. Kennedy, O. C. F. Krueger, F. L. Otter, Rex Wendle, Carey Bennett, J. B. Biker, A. R. Cochrane, C. A. Connaughton, F. G. Ellis, W. G. Guernsey, W. W. Mitchell, P. B. Rowe, L. E. Spence, W. M. Saling, A. B. Hatch, and Dean F. G. Miller.

Baird Gregory
Biker Rowe Hoffman Mitchell Fox Connaughton Anderson
Davis Ellis Cochran Saling Hatch Spence

SENIOR REPORTS

ANDERSON: "I'm going over to see Attle for a few days!"

BAIRD "When I got out here in Wyoming where they wear a 'gat' on one hip and a bottle on the other, I thought that I was in Chicago."

BIKER: "Yes, I'm one of the June grooms, to be. With the Idaho Forester and All, it's been a pretty busy year."

COCHRAN: "Yes, yes—yes, yes. I shall return, of course, to assist the Dean to carry on. Yes, I drank two bottles of Percy's hair restorer. It's a great tonic —for spring fever!"

CONNY: "My hair is falling out, too."

DAVIS: "I do not choose to talk-in public." That is saying a lot—for a Californian.

ELLIS: "I've got money in the bank and cattle on the range!"

FOX: "No, I wasn't chewing snoose when that picture was taken."

GREGORY: "My only hobbies are golfing and truck-driving."

HATCH: "I absolutely refuse to be quoted."

MITCHELL: "Guess I will have to buy new field clothes this spring. 'Bob' and 'Shorty' ruined my last year's outfit."

ROWE: "There should be a law forbidding the publishing of false advertisements. That 29 cents Quick Hair Restorer is a farce. My scalp remains as hairless as an egg. What little did come resembled peach fuzz. How about you, Al?"

SALING: "Bough beds are not what they're 'cracked up' to be."

SPENCE: "I agree with 'Hank.' Let us have bigger and better things to eat. Give me six eggs—and a hind quarter of that mule."

HOFFMAN: "Well, now, I don't like these Moscow meals. They give you just enough to half fill a flea at a formal banquet. Back to the lumber camp for me, where a serving is a meal and three servings are a fairly good start."

ALUMNI AND FORMER STUDENTS

BARTLETT STANLEY F., (Ex.) 1921-22.

Mr. Bartlett is doing art and editorial work for the Northern Magazine, official organ of the Great Northern Paper Company. He writes, "While visiting one of the company camps recently, was interested to learn that a couple of days before, Professor Behre, under whom I had studied at the old U. of I., had stayed there while doing some special forestry work." Mr. Bartlett's address is Locke's Mills, Maine.

BAUMANN, HERMAN, B. S. (For.) '24

Since graduation, Mr. Baumann is Forester to the Fruit Growers Supply Company of Susanville, California.

BAIRD, John C., '27.

Baird is Junior Range Examiner on the Medicine Bow National Forest. His present address is Holmes, Wyoming, c/o Keystone Ranger Station.

BEALS, W. F., B. S. (For.) '27.

Beals was first on a timber sale in the Washakie National Forest, but recently he was given a ranger district in the Harney National Forest with headquarters out of Lauzon, South Dakota He writes that the country is "plenty dry" and lots different from the hills in Idaho.

BEDWELL J. L., B. S. (For.) 20.

Mr. Bedwell is assistant pathologist in the Bureau of Plant Industry; Office of Blister Rust Control. He is in charge of reconnaisance on federal and private lands. "Married and have two daughters," he writes. His address is 618 Realty Building Spokane, Washington.

BIELER PAUL S., '21-22.

Mr. Bieler is employed as draftsman and photographer for the Southern Pacific R. R. "Married", he writes, "and have two fine girls. Also have a Boy Scout Troop. Teaching them all to be foresters." Mr. Bieler gives his address as 2928 Grant Ave., Ogden, Utah.

BOLLES, W. H., B. S. (For.) '26.

Since graduation, Bolles has been employed as Junior Forester out of McCall, Idaho. He writes that he is getting lots of good experience and likes the work. He also states that he met Collis Huntington at the meeting of the Society of American Foresters at San Francisco. Bolles has accepted a research fellowship from Yale School of Forestry for next year.

BURROUGHS I. C., B. S. (For.) '27.

"Ike" is taking his Master's degree at Yale, specializing in silviculture and management. His address is 44 Kelsey Road, Poughkeepsie, New York.

CRUZ, EUGENIO DE LA, B. S. (For.) '26.

After graduating, Mr. Cruz took his Master's degree at Yale, and returned to the Philipines. He then took a contract to appraise some private timber. This was the first work of this kind ever done in the Philippines. Mr. Cruz is now with the Forest Service as Junior Forester in charge of land classification all over the Islands. He writes that he was married December 1st, and is living at 1315 O'donnell, Manila, P. I.

CUMMINGS, LEWIS A., B. S. (For.) '25.

Mr. Cummings is doing timber survey work on the Superior National Forest. He can be reached at Ely, Minnesota. Cummings has received a scholarship from the Yale Forest School and will study there next year.

CHAMBERLIN, GALE B. '22.

Mr. Chamberlin, formerly with the Brooks-Scanlon Lumber Co., is now in the wholesale lumber business in Spokane. He was married in 1924 and has one son. "Always glad to get the Forester," he writes. His address is 1303 Old National Bank Bldg., Spokane, Washington.

COCHRELL, ALBERT N., Ranger '22.

Cochrell is assistant supervisor on the Kaniksu National Forest, with headquarters at Newport, Washington.

DANIELS, ALBERT S., B. S. (For.) '23.

Daniels is chemist to the Southern Pacific Railroad in Texas and Louisiana, doing wood preservative work. He was married in 1924 to Margaret Macey of the class of '24. His address is Box 19, S. P. Bldg., Houston, Texas.

DOYLE, IVAN S., B. S. (For.) '26.

"Ike" had a seige of pneumonia this winter but is back on the job again now. He is with the Clearwater Timber Co., Pierce, Idaho.

FARRELL, JAMES W., B. S. (For.) '22.

"Assistant Supervisor, Idaho National Forest," his questionnaire reads. Mr. Farrell was married in 1924 and has one boy. His headquarters are at McCall, Idaho.

FERGUSON, RAY S.

Mr. Ferguson is a Ranger on the Selway

National Forest. He writes that R. L. Hand, F. W. Shaner, Leroy Lewis and George Case are all on the Selway. All can be reached at Kooskia, Idaho, c/o U. S. F. S.

FENN, LLOYD A., B. S. (For.) '26.

Mr. Fenn is practicing law at Kooskia, Idaho. For several years he has been a member of the Idaho state legislature.

FIELD, WALTER D., B. S. (For.) '26.

Walt is in the land department of the Clearwater Timber Co,, head offices at Lewiston, Idaho.

GARNER, L. H., Ranger '23.

Mr. Garner is a ranger out of Evanston, Wyo. He was married in 1925 and has one boy.

GATLEY, HOWARD A.

Mr. Gatley is Scout Executive, Boy Scouts of America and can be reached at 710 Chestnut St., Terre Haute, Indiana.

GERRARD, PAUL H., B. S. (For.) '23.

At present Paul is assistant supervisor of the Clearwater National Forest, headquarters at Orofino, Idaho

GILLHAM, NORMAN F., B. S. (For.) '26.

Mr. Gillham is now in business in Moscow.

GREENE, E. G., B. S. (For.) '27.

Mr. Greene is in business in Moscow with Mr. Gillham.

GODDEN, FLOYD W., B. S. (For.) '27.

He has recently started making a management plan for the South Fork of the Payette Working Circle. Godden was a visitor here this winter. He is Junior Forester on the Payette National Forest, headquarters at Emmett, Idaho.

GUSTAFSON, CARL A., B. S. (For.) '27.

"Gus" was Second Lt. in the U. S. Army for a while but resigned and is now in the Forest Service, working out of Salt Lake. "Because I like it better", he says. He plans to continue his education at the University of California this year.

HEGGIE, TRACEY L., '27.

"Trace" is working on grazing reconnaisance out of Albuquerque, N. M.

HAMEL, JOSEPH H., '21-'22.

Mr. Hamel is a patient in the U. S. Veterans hospital at Bremerton, Washington.

HAMMOND GEORGE M., '20.

Mr. Hammond is Vice President and Secretary of the Bowerman Lumber Co., Glendale, California. He reports visiting with Francis Bartlett who is a C. P. A. in Oakland, Calif.

HEDRICK, NEIL H., Ex. '28.

Neil is employed at present as a carpenter at Willapa, Wash., he writes.

HUNTINGTON, COLLIS H., '26.

Mr. Huntington is on timber sale work in the Crater National Forest, headquarters at Medford, Oregon.

JACKSON, TOM B. S. (For.) '19.

Mr. Jackson is woods superintendent for the Fruit Grower's Supply Co., Susanville, Calif.

JOHNSTON, R. H., B. S. (For.) '27

"Jerry" is with the Clearwater Timber Co. Lewiston, Idaho. He also slipped one over the boys and was married this spring to Roa Groves of Moscow

KANE, VINCENT.

Kane can be reached at 2022 Lockport St., Niagara Falls, New York.

KELLY, R. C.

Kelly is working in a steel mill but expects to get back to the timber soon. His address is 427 Orchard Ave., Elwood City, Pa.

KEMP R. L., Ex. '27.

Kemp is yard foreman for the Panhandle Lumber Co., Spirit Lake, Idaho.

LEHRBAS, MARK M., B. S. (For.) '27.

After graduation, Lehrbas spent several months in travel and is now Junior Forester located at Hot Springs, Arkansas.

MALMSTEN, HARRY E., B. S. (For.) '17.

Malmsten is Assistant Professor of Forestry at the University of California, Berkeley.

MARTIN, P. J., '17.

"Special Agent, Chapman and Nauman Company, Spokane, Wash.," Mr. Martin's report reads. His address is 426 Chamber of Commerce Bldg., Spokane.

MILLER, WILLIAM B., B. S. (For.) '22.

Mr. Miller is with the U. S. Biological Survey in Alaska, conducting experimental work with reindeer Reindeer grazing will be an important industry in Alaska soon, according to Mr. Miller. He was married in 1925. His addess is U. S. Biol. Survey, Fairbanks, Alaska. Miller visited the States in April and May.

MALHOTRA, DES RAJ, B. S. (For.) '25.

Mr. Halhotra is Assistant Conservator of Forestry to the State of Kashmire, India, with headquarters at Jammu, Kashmire State, India.

MORRIS, LEO F., Ex. '16.

Mr. Morris has a stock and bond business in Spokane, Wash., with offices at N. 6 Wall Street.

OLSEN, CLARENCE C., B. S. (For.) '26

"Ole" is a Junior Forester on the Deschutes National Forest. He was married in 1926 and writes that he has a marvelous daughter. As usual "Ole" is up to something and says that he is now hunting for footprints of Fremont, the Pathfinder. His address is U. S. F. S., Crescent, Oregon.

PAGE, MILFORD M., Ex. '28.

"Page" is a scaler for the Clearwater Timber Co., Pierce, Idaho. He writes that he had a little "luck" of a broken leg this winter but is all right now. He was married in 1926 and was recently a proud father.

PARSONS, RUSSELL M., (For.) '24.

Mr. Parsons is a licensed land surveyor and timber cruiser for the Clearwater Timber Co., Pierce, Idaho. He was married last August.

PIKE, GALON W., B. S. (For.) '27.

"Gale" is taking his Master's at Yale, specializing in management and mensuration. "Under Chapman", he adds.

POTTER, ARTHUR, '23-'24.

Mr. Potter is assistant supervisor on the Boise National Forest, headquarters at Boise.

PUGH, LAWRENCE R., B. S. (For.) '26.

Mr. Pugh is a lumber salesman at Springston, Idaho.

RENSHAW, EMERA W., B. S. (For.) '25.

Mr. Renshaw was deputy state forester for two years but is now with the Forest Service.

RETTIG, E. C., B. S. (For.) '19.

Mr. Rettig is Land Agent for the Clearwater Timber Co., Lewiston, Idaho. He was married in 1925 and has one boy.

RODNER, JACK W., '24.

"Jack" is cruiser for the Blackwell Lumber Co., Emida, Idaho.

ROBINSON, ERNEST G., '23-'24.

Mr. Robinson was formerly with the Clearwater Timber Co., as fire warden but is now sheriff of Clearwater County, Idaho. "Busier than a ranger with a quarter section fire, high wind and no men," he writes. When at home his address is Orofino, Idaho.

SHARMA, PARMISHIRIE DAS, B. S. (For.) '22.

Sharma is Technical Adviser Forest Branch, State of Gwalior, India.

SAJOR, VALENTIN, B. S. (For.) '26.

Mr. Sajor took his Master's at Yale and then returned to the Philippines where he is instructor in forestry at the School of Forestry, Los Banos College, Laguna, P. I. He is now stationed at Manila with the Forest Service, doing grazing work which is a new field in the Island Service.

SCHOFIELD, WILLIAM R., B. S. (For.) '16.

"Supervisor, Humboldt Redwood Reforestation Association, an association of all Redwood Manufacturers of Humboldt Co., Calif." Mr. Schofield writes. He mentions seeing several Idaho graduates at the Idaho-St. Mary's game this year. He can be reached at Samoa, California.

SMITH, WILLIAM H. '25.

Mr. Smith is a ranger in charge of a timber sale out of Wallowa, Oregon. He states that Mr. Jerald Tucker of his class is a ranger on the Umatilla National Forest at La Grande.

SPACE, RALPH S., B. S. (For.) '25.

Mr. Space is a Junior Forester on the Blackfoot National Forest, Kalispell, Montana. Ralph was a caller at the school in December.

SPACE, JACKSON W., B. S. (For.) '27.

"Jack was with the Forest Service last summer, until October when he underwent an operation for appendicitis. He spent the rest of the winter convalescing and studying for the Junior Forester examination.

SNOW, ELVA A., B. S. (For.) '25.

Mr. Snow is a Junior Forester on the Medicine Bow National Forest with headquarters at Laramie, Wyoming

SOWDER, ARTHUR M., B. S. (For.) '25; M. S. (For.) '27.

"Art" is Extension Forester to the State of Idaho with offices at Moscow. Last winter he was married to Rose Pruess '27.

STEVENS, ARTHUR W., B. S. (For.) '15.

Mr. Stevens is with C. W. Swearingen, consulting Engineer of Great Falls, Montana He writes that he is busy in Missoula on the design and installation of a new sewer system. His address is Box 107, Missoula, Montana.

TOOLE, ARLIE W., B. S. (For.) '27.

"Arlie" has been Deputy State Forester since graduation, with offices at Moscow.

WHITE, HAROLD Z., B. S. (For.) '26.

White is superintendent of the dry kilns at the new Clearwater Timber Company mill at Lewiston, Idaho.

WALRATH, FAIRLY, B. S. (For.) '27.

Fairly is with the Clearwater Timber Company at Lewiston, Idaho.

WARD, ROBERT D., Ex. '28.

"Bob" is at Detroit now but expects to return to Idaho soon.

WHEATON, ROGERS G., B. S. (For.) '24.

Mr. Wheaton who was formerly District Forester, North Carolina Forest Service, is now Assistant Silviculturist at the Northeastern Forest Experiment Station He writes that he was married May 23, 1927 to Marjorie Scott of Springfield, Mass. He can be reached at 631 White Street, Springfield Mass.

YATES, DONALD R., B. S. (For.) '17.

Mr. Yates is secretary-treasurer of the Exter company, a realty company in Seattle, with offices at 810 Allison street.

ZUVER, JOHN H. JR., Ex. '26.

Mr. Zuver is vice president of the Mirror Press Inc., South Bend, Indiana. He was married in 1925.

WHAT THE BOYS WILL BE DOING

(Continued from Page 38)

National Forest. Forest Service, Boise, Idaho.

Dittman, Clarence P. Engineering crew on a construction job. 408 Liberty Street, Aurora, Illinois.

Dodd, Jack B. Blister Rust Control, 618 Realty Building, Spokane, Wn.

Eastman, Virgil. Trail crew, Clearwater National Forest, Forest Service, Orofino, Idaho.

Ensign, Warren W. Research for School of Forestry, School of Forestry, Moscow, Idaho.

Fagerlund, Gunner. Trail crew, Kaniksu National Forest. Forest Service, Priest River, Idaho.

Fisher, George M. Blister Rust reconnaissance, 618 Realty Building, Spokane, Wn.

Fritchman, Holt. Blister Rust eradication. 618 Realty Building, Spokane, Wn.

Fuller, G. Lester. Road construction. 25 Frederick Street, Ilion, N. Y.

Goodwin, C. Wayne. St. Joe National Forest, Forest Service, Avery, Idaho.

Guernsey, William G., Blister Rust eradication. 618 Realty Building, Spokane, Wn.

Hatch, Alden B. Experimental work. Appalachian Forest Experiment Station, Asheville, North Carolina.

Hepher, William S. Assistant Ranger, B. C.

Forest Service, New Denver, British Columbia.

Hill, Edward B. Cruising, Weiser National Forest, Forest Service, Council, Idaho.

Hjort, George V., Foreman, trail location, crew, Kootenai National Forest. Forest Service, Libby, Montana.

Hume, John F. Alternate Ranger, Pend Oreille National Forest. Forest Service, Clark's Fork, Idaho. co- Antelope Ranger Station.

Illichevsky, George J. Ecology work for the Blister Rust. 618 Realty Building, Spokane, Washington.

Jemison, George M. Smoke chaser, Coeur d'Alene National Forest. Forest Service, Coeur d'Alene, Idaho. c-o Magee Ranger Station.

Johnson, Robert B. Timber survey, Weiser National Forest. Forest Service, Weiser, Idaho.

Keene, Edward L. Sample plot work, School of Forestry. School of Forestry, Moscow, Idaho.

Kennedy, Fred H. Timber survey, Targhee National Forest. Forest Service, Ashton, Idaho.

Kennedy, Howard R. Trail crew, Clearwater Timber Protective Association, Clearwater Timber Company, Pierce, Idaho.

Krueger, Otto. Sample plot work, School of Forestry. School of Forestry, Moscow, Idaho.

Krummes, William T. Experimental work, Minidoka National Forest, Forest Service, Burley, Idaho.

Langer, Charley J. Assistant Ranger, Clearwater National Forest. Forest Service, Weippe, Idaho. c-o Musselshell Ranger Station.

Lord, Philip B. Lookout, Salmon National Forest. Forest Service, Northfork, Idaho.

Madison, Roy W. Alternate Central Dispatcher, Umatilla National Forest. Forest Service, Kamela, Oregon.

Miller, Richard B. Sawmill work, Salmon, Idaho.

Mitchell, William W. 1105 Madison Street, Wilmington, Delaware.

Moss, Virgil D. Blister Rust, reconnaissance. 618 Realty Building, Spokane, Washington.

Newcomer, Fred R. Guard on Big Horn National Forest. Forest Service, Sheridan, Wyoming. c-o Penrose Park Ranger Station.

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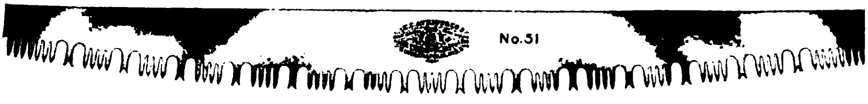

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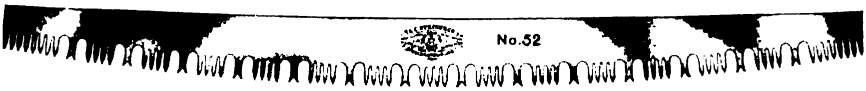

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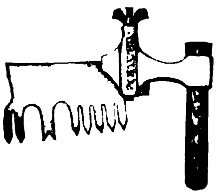

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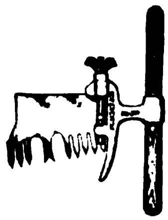

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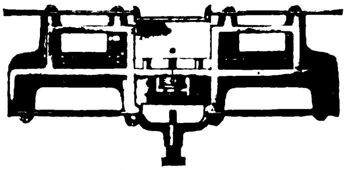

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Ommanney, Herbert T. Dispatcher, B. C. Forest Service, Grand Forks, B. C.

Otter, Floyd L. Assistant Ranger, Lolo National Forest. Forest Service, Lolo Hot Springs, Montana. c-o Powell Ranger Station.

Pechanec, Joseph F., School of Forestry, Moscow, Idaho.

Prater, Vilas E. Forest Service, Jackson Hole, Wyoming. Address: St. Anthony, Idaho.

Richardson, Kenneth F. Trail crew near Wallace, Idaho. Box 997, Burke, Idaho.

Rohn, Don C. Smoke chaser, Umatilla National Forest. Forest Service, Pendleton, Oregon. c-o Tollgate Ranger Station.

Rowe, Percy B. Blister Rust, reconnaissance. 618 Realty Building, Spokane, Wn.

Saling, Wallace M. Field Assistant, Northern Rocky Mountain Forest Experiment Station, Priest River, Idaho.

Sargeant, Howard J. Fireman, Clearwater National Forest. Forest Service, Orofino, Idaho.

Shank, Paul J. Assistant Ranger, Salmon National Forest. Forest Service, Northfork, Idaho.

Sowder, James E. Lookout, Blackfoot National Forest. Forest Service, Trego, Mont.

Stanley, Wilfred B. R. O. T. C. Summer Camp, 12 East 27th Ave,, Spokane, Washington.

Stock, Merlin R. Assistant Ranger on the Minidoka National Forest, Naf. Idaho. c-o Erwin Jones.

Swain, Robert F. Lookout, Mount Baker National Forest; Forest Service, Concrete, Wn.

Talbott, Loyal E. Trail crew, Kaniksu National Forest. Forest Service, Newport, Wn.

Taylor, Cyprian D. Geographical Survey work, Route 1, Nelson, B. C.

Teater, Arthur S. Sunnyside Orchard Com-

Uglem, Harold A. Clearwater mill at Lewiston. Corner Eighth and Highland Streets, Clarkston, Washington.

Urell, Thomas. Trail crew, Nez Perce National Forest. Forest Service, Grangeville, Idaho.

Waddell, Robert M. Draftsman for Philadelphia Electric Company, No. 3 E. Turnbull Avenue, Upper Darby P. O., Philadelphia, Pennsylvania.

Wendle, Rex. Fire Patrolman, Pend Oreille pany, Weiser, Idaho. Route 3.

National Forest. Forest Service, Sandpoi Idaho.

Whiting, Harry L. Blister Rust reconnai sance, 618 Realty Building, Spokane, Was ington.

Woodward, Doren E. Trail crew, Coeur d'Ale National Forest. Coeur d'Alene, Idaho, c/ Forest Service.

Woesner, Raymond C. Protective work fc Potlatch Timber Protective Association, El River, Idaho.

Zoerb, Ernest L. Traveling at home and i the Orient. 2700 Cass Street, LaCrosse, Wis consin.

Advisory Committee to the Forest Experimen Station

The outstanding development of the Schoo of Forestry the current year was the creatio of the Forest Experiment Station. This is forward looking step on the part of the Stat Board of Educaiton and one that will ad distinct strength to the School, not only i its research activities, but in its instructiona work as well.

In outlining the objects and scope of the new Station, the School sought the assistance of an Advisory Committee, consisting of the state forester and four practical operators. The personnel of this Committee is: W. C. Geddes, Manager of the Craig Mountain Lumber company, Chairman; W. D. Humiston, Assistant General Manager of the Potlatch Lumber Company; W. S. Rosenberry, Manager of the Winton Lumber Company; C. L. Billings, Assistant General Manager of the Clearwater Timber Company; and Ben E. Bush, Idaho State Forester.

This Committee has already held three meetings and, with its advice, the budget for the maintenance of the Station and the investigative program to be undertaken for the biennium beginning January 1, 1929, have been set up. However, through the financial aid of the state forester's office, the timber owners of the state, and the Western Pine Manufacturers' Association the additional personnel of the Station for which the plans provide will be added September 1, 1928. Accordingly, the Board of Education has authorized two new associate professorships and two research fellowships for the coming academic year.

Adds a Car of Logs a Day!